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W W Hamilton

FORTY-SIXTH ANNUAL REPORT

OF THE

INDIANA

STATE BOARD OF AGRICULTURE.

VOLUME XXXVIII—1896-1897.

**Including the Proceedings of the Annual Meeting, 1897; Reports of
County and District Societies, State Meetings of Swine
Breederers, Wool Growers, Poultry Association,
Farmers' Institutes, Experiment Station,
Statistics on Vegetables and Ce-
reals, and Table of Com-
mercial Fertilizers.**

TO THE GOVERNOR.

INDIANAPOLIS:
WM. B. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING.
1897.

THE STATE OF INDIANA,
EXECUTIVE DEPARTMENT,
INDIANAPOLIS, Sept. 30, 1897. }

Received by the Governor, examined and referred to the Auditor of State for verification of the financial statement.

OFFICE OF AUDITOR OF STATE,
INDIANAPOLIS, Sept. 30, 1897. }

The within report, so far as the same relates to moneys drawn from the State Treasury, has been examined and found correct.

A. C. DAILY,
Auditor of State.

SEPTEMBER 30, 1897.

Returned by the Auditor of State, with above certificate, and transmitted to Secretary of State for publication, upon the order of the Board of Commissioners of Public Printing and Binding.

CHAS. E. WILSON,
Private Secretary.

Filed in the office of the Secretary of State of the State of Indiana, September 30, 1897.

WILLIAM D. OWEN,
Secretary of State.

Received the within report and delivered to the printer this 30th day of September, 1897.

THOS. J. CARTER,
Clerk Printing Bureau.

M E M B E R S
OF THE
Indiana State Board of Agriculture,
—1896—

- 1st District—JOHN C. HAINES, Lake, Spencer County.
2d District—MASON J. NIBLACK, Vincennes, Knox County.
3d District—W. W. STEVENS, Salem, Washington County.
4th District—J. W. LAGRANGE, Franklin, Johnson County.
5th District—V. K. OFFICER, Volga, Jefferson County.
6th District—W. W. HAMILTON, Greensburg, Decatur County.
7th District—H. B. HOWLAND, Howland, Marion County.
8th District—CHARLES DOWNING, Greenfield, Hancock County.
9th District—JAS. M. SANKEY, Terre Haute, Vigo County.
10th District—JOHN L. DAVIS, Crawfordsville, Montgomery County.
11th District—M. S. CLAYPOOL, Muncie, Delaware County.
12th District—W. M. BLACKSTOCK, Lafayette, Tippecanoe County.
13th District—JOHN L. THOMPSON, Gas City, Grant County.
14th District—C. B. HARRIS, Goshen, Elkhart County.
15th District—AARON JONES, South Bend, St. Joseph County.
16th District—JAS. E. McDONALD, Ligonier, Noble County.
-

OFFICERS FOR 1896.

W. W. HAMILTON, *President.*

JAS. E. McDONALD,
Vice-President.

E. H. PEED,
General Superintendent.

CHAS. F. KENNEDY,
Secretary.

E. J. ROBISON,
Treasurer.

Executive Committee.

Messrs. JONES, DOWNING, HARRIS AND OFFICER.

BOARD OF AGRICULTURE.

A TABLE Showing the Officers, Place and Premiums Paid of Each Fair Held by the State Board of Agriculture.

Year	PRESIDENT.	SECRETARY.	TREASURER.	GENERAL SUPERINTENDENT.	PLACE OF FAIR.	PREMIUMS PAID.
1852	Gov. Joseph A. Wright.	John B. Dillon.	Royal Mayhew.	W. T. Dennis.	Indianapolis	..
1853	Gov. Joseph A. Wright.	John B. Dillon.	Royal Mayhew.	J. J. Bingham.	Lafayette	..
1854	Gov. Joseph A. Wright.	Wm. T. Dennis.	Royal Mayhew.	W. T. Dennis.	Madison	..
1855	Gov. Joseph Orr.	John B. Dillon.	S. A. Buell.	Calvin Fletcher, Jr.	Indianapolis	\$2,753 00
1856	Dr. A. C. Stevenson.	Ignatius Brown.	S. A. Buell.	Calvin Fletcher, Jr.	Indianapolis	4,225 00
1857	Dr. A. C. Stevenson.	Ignatius Brown.	S. A. Buell.	Calvin Fletcher, Jr.	Indianapolis	4,127 00
1858	Dr. A. C. Stevenson.	John B. Dillon.	Thomas H. Sharp.	Calvin Fletcher, Jr.	Indianapolis	..
1859	George D. Wagner.	John B. Dillon.	Thomas H. Sharp.	Calvin Fletcher, Jr.	New Albany	6,163 00
1860	George D. Wagner.	Wm. T. Dennis.	Thomas H. Sharp.	James L. Bradley.	Indianapolis	3,827 00
1861	D. P. Hottelway.	Wm. T. Dennis.	H. A. Fletcher.	James L. Bradley.	Indianapolis	..
1862	James D. Williams.	W. H. Loomis.	H. A. Fletcher.	J. A. Grosvenor.	No Fair.	3,994 00
1863	A. D. Hamrick.	W. H. Loomis.	H. A. Fletcher.	J. A. Grosvenor.	Indianapolis	..
1864	Stearns Fisher.	W. H. Loomis.	Francis King.	W. H. Loomis.	Indianapolis	4,121 00
1865	Stearns Fisher.	W. H. Loomis.	Carlos Dickson.	J. A. Grosvenor.	Fort Wayne.	4,078 00
1866	Stearns Fisher.	W. H. Loomis.	Carlos Dickson.	J. A. Grosvenor.	Indianapolis	..
1867	A. D. Hamrick.	A. J. Holmes.	Carlos Dickson.	J. B. Sullivan.	Terra Haute	6,331 00
1868	A. D. Hamrick.	A. J. Holmes.	Carlos Dickson.	J. B. Sullivan.	Indianapolis	7,087 00
1869	A. D. Hamrick.	A. J. Holmes.	Carlos Dickson.	J. B. Sullivan.	Indianapolis	7,517 00
1870	J. D. Williams.	Joseph Poole.	Carlos Dickson.	J. S. Benson.	Indianapolis	7,914 00
1871	J. D. Williams.	Joseph Poole.	Carlos Dickson.	Jacob Mutz.	Indianapolis	8,564 00
1872	John Sutherland.	Alex. Herron.	Carlos Dickson.	H. W. Caldwell.	Indianapolis	9,619 20
1873	John Sutherland.	Alex. Herron.	Carlos Dickson.	H. W. Caldwell.	Indianapolis	8,804 75
1874	John Sutherland.	Alex. Herron.	Carlos Dickson.	K. J. Howland.	Indianapolis	10,754 00
1875	William Grim.	Alex. Herron.	Carlos Dickson.	K. J. Howland.	Indianapolis	12,068 20
1876	Heskiah Caldwell.	Alex. Herron.	Carlos Dickson.	J. L. Hanna.	Indianapolis	8,179 20
1877	Jacob Mutz.	Alex. Herron.	Carlos Dickson.	J. W. Furnas.	Indianapolis	6,537 95
1878	W. B. Seward.	Alex. Herron.	Carlos Dickson.	R. M. Lockhart.	Indianapolis	5,057 00
1879	Robert Mitchell.	Alex. Herron.	Carlos Dickson.	R. M. Lockhart.	Indianapolis	5,472 00
1880	W. H. Ragan.	Alex. Herron.	Carlos Dickson.	Fielding Beeler.	Indianapolis	6,553 00
1881	R. M. Lockhart.	Alex. Herron.	J. A. Wildman.	Fielding Beeler.	Indianapolis	6,855 50
1882	J. H. C. Meredith.	Alex. Herron.	J. A. Wildman.	Fielding Beeler.	Indianapolis	6,096 00
1883	L. B. Custer.	Alex. Herron.	J. A. Wildman.	Fielding Beeler.	Indianapolis	9,581 13
1884	Robert Mitchell.	Alex. Herron.	S. Johnson.	Fielding Beeler.	Indianapolis	10,414 30
1885	R. M. Lockhart.	Alex. Herron.	S. Johnson.	Fielding Beeler.	Indianapolis	9,000 50
1886	W. B. Seward.	Alex. Herron.	S. Johnson.	H. B. Stout.	Indianapolis	9,419 00
1887	W. B. Seward.	Alex. Herron.	S. Johnson.	Chas. E. Merrifield.	Indianapolis	9,728 50
1888	J. N. Davidson.	Alex. Herron.	S. Johnson.	R. M. Lockhart.	Indianapolis	9,917 50
1889	J. N. Davidson.	Alex. Herron.	S. Johnson.	C. E. Merrifield.	Indianapolis	10,200 00

A TABLE Showing the Officers, Place and Premiums Paid of Each Fair Held by the State Board of Agriculture—Continued.

Year	PRESIDENT.	SECRETARY.	TREASURER.	GENERAL SUPERINTENDENT.	PLACE OF FAIR.	PREMIUMS PAID.
1890	W. A. Banks	Alex. Herron	S. Johnson	C. E. Merrifield	Indianapolis	\$13,040 50
1891	W. A. Banks	Leon T. Bagley	S. Johnson	C. E. Merrifield	Indianapolis	15,297 00
1892	J. M. Bogs	Leon T. Bagley	S. Johnson	E. H. Peed.	Indianapolis	19,876 00
1893	V. K. Officer	Chas. F. Kennedy	Jas. A. Wildman	E. H. Peed.	Indianapolis	18,407 50
1894	J. M. Sankey	Chas. F. Kennedy	E. J. Robison	E. H. Peed.	Indianapolis	18,516 70
1895	J. M. Sankey	Chas. F. Kennedy	E. J. Robison	E. H. Peed.	Indianapolis	17,561 98
1896	W. W. Hamilton	Chas. F. Kennedy	E. J. Robison	E. H. Peed.	Indianapolis	14,817 17
1897	C. B. Harris	Chas. F. Kennedy	E. J. Robison	E. H. Peed.	Indianapolis . . . . .	. . . . .

* Henry C. Meredith died July 5, 1882, and the Vice-President, L. B. Custer, served the unexpired term.

State Industrial Associations.

OFFICERS FOR THE YEAR 1897.

The Indiana State Board of Agriculture.—President, Hon. C. B. Harris, Goshen, Elkhart County; Secretary, Charles F. Kennedy, Indianapolis.

Indiana Horticultural Association.—President, C. M. Hobbs, Bridgeport; Secretary, James Troop, Lafayette.

Indiana Shorthorn Breeders' Association.—President, James D. Williams, Pond Creek Mills, Knox County; Secretary and Treasurer, C. E. Thompson, Irvington, Marion County.

Indiana Dairymen's Association.—President, O. A. Stubbs, Henry County; Secretary and Treasurer, H. C. Beckman, Brunswick, Ind.

Indiana Wool Growers' Association.—President, T. C. Phelps, Henry County; Secretary, F. W. Robe, Greencastle.

Indiana Swine Breeders' Association.—President, Adam May, Shelbyville; Secretary, H. L. Nowlin, Lawrenceburg.

Indiana Poultry Breeders' Association.—President, Sid Conger, Flat Rock, Ind.; Secretary, Thos. W. Pottage, Indianapolis.

Indiana Bee-Keepers' Association.—President, J. M. Hicks; Secretary, E. S. Pope.

Indiana Jersey Cattle Club.—President, J. H. Matlock, Brownstown, Ind; Secretary, W. S. Budd, Sixth and Canal Streets, Indianapolis, Ind.

Farmers' Institutes.—Director, Prof. W. C. Latta, Purdue University, Lafayette, Ind.

Experiment Station.—Director, Prof. C. S. Plumb, Purdue University, Lafayette, Ind.

THE INDIANA

STATE BOARD OF AGRICULTURE.

CONSTITUTION.

—AS—

Revised and Adopted at the January Meeting of the Board, 1891.

ARTICLE 1. The name and style of this society shall be "The Indiana State Board of Agriculture," its objects, to promote and improve the condition of agriculture, horticulture, and the mechanic, manufacturing and household arts.

ART. 2. There shall be held in the city of Indianapolis, in such time as may be prescribed by law, an annual meeting of the State Board of Agriculture, together with Presidents, or other delegates duly authorized, from each county, or such other agricultural society as may be authorized by law to send delegates, who shall, for the time being, be *ex officio* members of the State Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects and condition of the agricultural interests throughout the State; and at such annual meetings the several reports from county societies shall be delivered to the President of the State Board of Agriculture; and the said President and delegates shall, at this meeting, elect suitable persons to fill all vacancies in this Board: *Provided, however,* That said election shall not affect the members of the Board present, whose terms shall not be considered to expire until the last day of the session.

ART. 3. The State Board elect shall meet immediately after the adjournment of the State Board, for the purpose of organization and for the transaction of such other business as the wants and interests of the society may require; and hold

such other meetings, from time to time, for making out premium lists, preparing for State Fairs, and all other business necessary to the promotion of the objects of the society.

ART. 4. The State Board elect shall consist of sixteen members, chosen from the following districts :

- 1st District—Posey, Vanderburgh, Gibson, Warrick and Spencer counties.
- 2d District—Knox, Davies, Martin, Pike, Dubois, Crawford and Perry counties.
- 3d District—Harrison, Washington, Orange, Floyd, Clark and Scott counties.
- 4th District—Jackson, Lawrence, Brown, Monroe, Green, Owen, Johnson and Sullivan counties.
- 5th District—Jefferson, Switzerland, Ohio, Dearborn, Franklin, Ripley and Jennings counties.
- 6th District—Bartholomew, Decatur, Rush, Fayette, Union and Wayne counties.
- 7th District—Madison, Hancock, Hamilton, Henry and Shelby counties.
- 8th District—Marion County.
- 9th District—Clay, Vigo, Parke, Vermillion and Fountain counties.
- 10th District—Putnam, Morgan, Hendricks, Montgomery and Boone counties.
- 11th District—Delaware, Randolph, Jay, Adams, Wells, Huntington and Blackford counties.
- 12th District—Carroll, White, Benton, Newton, Tippecanoe, Warren, Jasper and Pulaski counties.
- 13th District—Clinton, Tipton, Howard, Grant, Wabash and Whitley counties.
- 14th District—Elkhart, Kosciusko, Fulton, Cass and Miami counties.
- 15th District—St. Joseph, Marshall, Starke, Laporte, Porter and Lake counties.
- 16th District—Allen, Dekalb, Steuben, Lagrange and Noble counties.

Chosen for two years, one-half of whose terms expire every year, to wit: Those representing the first, second, third, fourth, seventh, fourteenth, fifteenth and sixteenth, expire at the annual meeting of 1860, and those representing the fifth, sixth, eighth, ninth, tenth, eleventh, twelfth and thirteenth districts, expire at the annual meeting to be held in January, 1861. To be chosen by ballot.

ART. 5. It shall be the duty of the President to preside at all meetings, conduct the business in an orderly and parliamentary manner, and officially sign all vouchers and drafts upon the Treasurer (except for premiums), and all other instruments requiring the same, and call special meetings in cases of emergency.

ART. 6. The State Board elect shall, at the annual meeting after the adjournment of the delegate meeting, proceed to elect one of their number President, who shall hold his office for a term of one year, and until his successor is elected and qualified, and one of their number for Vice-President, whose term shall be the same as President, who shall act, and for the time being, have all the power as President, whenever the President is absent from any regular meeting. They shall also elect some suitable person as Secretary and some suitable person as Treasurer, and a General Superintendent, who shall hold their offices each for one year, unless removed for incompetency or neglect of duty. They shall also elect four of their number who shall, with the President, constitute an Executive

Committee, who shall have power to act in cases of emergency, where loss would result by waiting till a regular meeting of the Board, but shall have no power whatever during a meeting of the Board.

ART. 7. It shall be the duty of the Treasurer to safely keep the funds belonging to the society, pay out the same on orders or drafts drawn by the Secretary, and report annually to the State Board, and as much oftener, as he may be called upon by the Board, and shall give bond for the faithful performance of his duties.

ART. 8. It shall be the duty of the General Superintendent to take care of and carefully keep all property belonging to the society, have the care and control of the Fair Grounds during the recess; have the supervision and oversight of such improvements or additions as may be directed by the State Board, and, under their direction, procure materials, contract for labor, and shall be, during the continuance of a Fair, the Chief Marshal and head of the police. The members of the Board shall employ all the necessary police and gate-keepers.

ART. 9. The Secretary shall keep a true record of the proceedings. He shall conduct all correspondence on behalf of the society, except when otherwise directed by the President. He shall, by himself and assistants by him appointed, arrange the details of the entries, tickets, and enroll the names of committees and judges of the State Fair, receive and record the various reports of the awarding committees, fill out and deliver all diplomas and certificates. It shall be the duty of the Secretary to condense the County Agricultural reports for each year into one volume and superintend the publishing of the same. He shall audit and file all accounts against the Board; draw orders in favor of the proper persons on the Treasurer for the amount; but orders shall not be drawn payable to order or bearer, but to the name of the party alone, or his agent. He shall make an annual report, showing amount of all orders upon the treasury, and shall perform such other duties as the best interests of the society may demand; but he is at all times subject to the direction and control of the State Board.

ART. 10. At the annual meeting of the Board the salaries of the Treasurer, Secretary and Superintendent shall be fixed for the ensuing year: *Provided*, That said Board may, in their discretion, at any meeting of said Board, make said officers an additional allowance for *extra* services.

ART. 11. That no compensation shall be allowed to delegates attending the annual meeting of the State Board; nor shall the members of the State Board elect be paid any sum of money, as compensation or otherwise, except by order of the Board elect.

ART. 12. The State Board may adjourn from time to time, or they may be called together by the Secretary, by order of the President, by a written notice to each member, enclosed by mail, and a notice of such meeting published in two or more newspapers of general circulation, in the city of Indianapolis; and all meetings so held by adjournment, or calls, shall be deemed regular and legal.

ART. 13. Any alteration or amendment to this Constitution may be made at the annual meeting of the State Board, two-thirds of all the members voting for such amendment.

ART. 14. The following standing committees shall be appointed by the President, to whom all matters of business coming up for reference under their particular heads, shall be referred, unless otherwise specially directed by the Board:

1. Finance and Claims.
2. Rules and Regulations.
3. Fair Grounds.
4. Unfinished Business.
5. Geological Survey—Executive Committee, *ex officio*.
6. Premium List.

AMENDMENTS TO THE CONSTITUTION.

At the May meeting in 1851, certain rules, embracing ten sections, for the government of county agricultural societies, were adopted by the Board of Agriculture, as required in Section 1 of the Statute laws enacted by the Legislature of Indiana for the "Encouragement of Agriculture," approved February 17, 1852.

At the February meeting of 1868 the rules were found inexpedient and were repealed, and the following resolutions, submitted by the Committee on Rules and Regulations, were adopted:

Resolved, That all county and district societies shall be organized and governed by the laws of the State of Indiana in regard to agricultural societies, and especially under the act passed by the Legislature and approved February 17, 1852.

Resolved, That all societies so organized will be entitled to send delegates to this Board (State Board of Agriculture) at its annual meetings, and will be received and acknowledged upon the presentation of their reports and credentials, and compliance with the laws as legally organized societies.

THE INDIANA

STATE BOARD OF AGRICULTURE.

ORGANIZATION OF THE BOARD FOR THE YEAR 1896.

WEDNESDAY, January 7, 1896.

Upon the adjournment of the State Board of Agriculture for the year 1895, the members holding over and the members elected for the year 1896 effected the following permanent organization, with V. K. Officer in the chair and all members of the Board present.

The election of officers proceeded by ballot and resulted:

President—W. W. Hamilton, of Decatur County.

Vice-President—Jas. E. McDonald, of Noble County.

Secretary—Chas. F. Kennedy, of Marion County.

Treasurer—E. J. Robison, of Marion County.

General Superintendent—E. H. Peed, of Henry County.

Executive Committee—Charles Downing, of Hancock County; Aaron Jones, of St. Joseph County; V. K. Officer, of Jefferson County, and C. B. Harris, of Elkhart County.

THE INDIANA STATE BOARD OF AGRICULTURE.
A RESUME OF ITS WORK FOR 1896.

STATE BOARD MEETING.

JANUARY 7, 1896.

Following the organization of the new Board the motion of Mr. Sankey that the Board proceed to elect a member of the Indiana Live Stock Sanitary Commission, to be recommended to the Governor for appointment, prevailed.

The names of Samuel Bowman, of St. Joseph County, and the name of M. S. Claypool, of Delaware County, were presented, and the Board, on the seventh ballot, selected Mr. Claypool.

Adjourned to meet on February 18 for the purpose of revising the Premium List.

STATE BOARD MEETING.

FEBRUARY 18, 1896.

Pursuant to adjournment the State Board convened.

Members present: Messrs Haines, Niblack, Stevens, Officer, Lagrange, Hamilton, Howland, Downing, Davis, Claypool, Blackstock, Thompson, Harris, Jones and McDonald.

On motion of Mr. Harris the Board created a new department to be known as the "Department of Privileges."

The motion of Mr. Jones that the Department of Entertainment be abandoned prevailed.

The motion of Mr. Officer that the name of the owner be written on the entry card in the Poultry Department prevailed.

James E. McDonald offered the following resolution, and moved its adoption, which motion prevailed:

WHEREAS, It has been charged that objectionable shows have been admitted on the Indiana State Fair grounds; therefore, be it

Resolved, That it is the sense of the Board that no objectionable shows be admitted on the grounds;

Resolved, That all contracts for privileges to the grounds, if in the opinion of the Superintendent of Privileges, the show or other business conducted by the purchaser of the privilege, is objectionable or improper, the lease shall be canceled by him and the business so conducted shall be stopped and the exhibit excluded from the grounds.

The motion of Mr. Jones that the grounds be carefully platted for mechanical exhibits and privilege purposes, and that the Secretary be instructed to provide sectional maps showing this part of the ground, prevailed.

The motion of Mr. Stevens that the Fair be held Sept. 14th to 19th, 1897, prevailed.

The motion of Mr. Lagrange that the Board shall set apart Tuesday, Sept. 15th, as children's day, and that all children be admitted to the grounds free, prevailed.

The motion of Mr. Claypool that all admission tickets be printed at some point away from Indianapolis, and that all tickets when received by the collectors be turned to the President to be audited by the Executive Committee, prevailed.

The motion of Mr. McDonald that the Board proceed to the selection of a janitor for the grounds, and the names of Harve Stearn and Louis Grim were presented. The first ballot resulted in the selection of Stearn.

The motion of Mr. Jones that the Board purchase a safe for the use of the Superintendent of Privileges, prevailed.

Department Superintendents named by the President:

Speed.—M. S. Claypool.

Heavy Horses.—Jas. M. Sankey.

Light Harness Horses.—Wm. M. Blackstock.

Beef Cattle.—J. W. Lagrange.

Dairy Cattle and Dairy Products.—C. B. Harris.

Swine.—H. B. Howland.

Sheep.—John L. Thompson.

Poultry.—John C. Haines.

Agriculture.—John L. Davis.

Horticulture.—James E. McDonald.

Art.—Charles Downing.

Mechanical.—W. W. Stevens.

Admissions.—Aaron Jones.

Privileges.—V. K. Officer.

Grand Stand.—Mason J. Niblack.

Adjourned to meet on call of President.

EXECUTIVE COMMITTEE MEETING.

MAY 27, 1896.

The members of the Executive Committee met on call of the President. The following present: Messrs. Hamilton, Jones, Officer and Harris.

Bonds of the Secretary and of the Treasurer were, on motion of Mr. Jones, approved and ordered returned to the custody of the President of the Board.

The motion of Mr. Officer that the committee ask Governor Matthews to invite the Governors of Ohio, Michigan, Illinois and Kentucky to join him for a "Governors' Day" prevailed.

The motion of Mr. Harris that the candidates for President on the various tickets be invited to visit the fair and deliver an address prevailed.

The motion of Mr. Officer that the selection of tickets be referred to the Superintendent of Admissions prevailed.

The motion of Mr. Harris that the President and Secretary be instructed to arrange for dinners for the officers, members, assistants and guests prevailed.

The motion of Mr. Harris that Mr. Jones be made a committee of one to arrange for an exhibit of motorcycles at the fair prevailed.

The motion of Mr. Jones that the sum of \$200 be set apart for bicycle races, and that a committee consisting of Mr. Officer and the Secretary be authorized to arrange for a Bicycle Day, prevailed.

The motion of Mr. Downing that the Board dedicate the Gallery of Art Hall for an exhibition of the X-rays, and that the Secretary be instructed to contract with Messrs. Caldwell & Haywood for such exhibition, prevailed.

STATE BOARD MEETING IN ADMINISTRATION BUILDING.

SEPTEMBER 16, 1896.

The motion of Mr. Jones that a committee be appointed to wait upon Governor Matthews and invite him to become the special guest of the Board prevailed.

SEPTEMBER 19, 1896.

The motion of Mr. Lagrange that the Superintendent of the Speed Department be authorized to declare all races off on account of rain-prevailed.

EXECUTIVE COMMITTEE MEETING.

DECEMBER 1, 1896.

The motion of Mr. Jones that the program of the Delegate State Board meeting to be convened January 11, 1897, be arranged to be completed in one day prevailed.

The motion of Mr. Officer that the President appoint a committee of three, who shall convene on the 5th of January, to audit the books of the Secretary and Treasurer, prevailed.

Committee—Messrs. Jones, Downing and Claypool.

ANNUAL MEETING OF THE DELEGATE STATE BOARD OF AGRICULTURE.

JANUARY 5, 1897.

In accordance with the provisions of the statutes of the State of Indiana, the Indiana Delegate State Board of Agriculture convened in the rooms of the Board at 9 o'clock A. M., the President, W. W. Hamilton, presiding. All members of the Board present.

President Hamilton. Gentlemen of the convention, you will please take seats and observe order, that we may proceed without interruption. I have been told since I came into the room that it is not agreeable for persons to smoke cigars at this time, as we have some ladies here.

The Rev. C. H. McDowell will pray for us this morning.

INVOCATION.

O, Lord, our God, we thank thee that thou art interested in the affairs of men in all they do that is right and holy and good, and we thank thee that thou art our Father and we can come to thee at all times with the assurance that thou wilt hear us and bless us. Now we pray thee, our God, to let thy blessing rest upon the gathering of these representatives of the great interests of our State. Grant to let thy blessing abide with them; inaugurate measures that will be for the good of this great State in which we live, in increasing its resources and in helping forward all its interests, that they may make it even greater as years go by. Let thy blessing be upon the presiding officers of this association. Give unto them wisdom and help, that they may give to this body of men such wisdom as thou hast endowed them with. Forgive every sin, guide us to thy praise and glory, and own us at last in thy kingdom, for Christ's sake. Amen.

President Hamilton. We will now have an address from the Mayor. I take pleasure in presenting the Hon. Thomas Taggart, Mayor of the city of Indianapolis.

Mayor Taggart.

Mr. President and Gentlemen of the State Board of

Agriculture and Delegates to the State Board Meeting:

Permit me to congratulate you this morning upon this large and intelligent gathering of gentlemen who have assembled from different parts of the State to listen to and hear the discussions of matters in which they are interested, and also to interest others, and for the purpose of selecting members of the State Board of Agriculture of Indiana. The class of gentlemen here represented include men in all the walks of life—the lawyer, doctor, merchant and farmer. It shows that the gentlemen here are representatives of their different professions, and come here, as I said before, for the purpose of assisting in selecting representatives or members of the State Board of Agriculture.

The State Board of Agriculture of Indiana is one that has done a great deal for the interests and advancement of Indiana. In looking over the statistics a few days ago I was surprised at seeing the progress, from an agricultural standpoint, of the grains that had been raised in Indiana. Not only is it rich in its agriculture, but also in its natural resources, such as coal and natural gas. Indiana is now one of the foremost states in the Union. Much is due to the State Board of Agriculture of Indiana. I believe this is the forty-fifth annual meeting. It grew all that time from a small gathering and to-day we see it in its present strength. That has been brought about by the active workings and the intelligent actions of the members of the State Board. You can take in Indiana to-day its colleges of education in the sciences, colleges that now may be ranked high, and I believe that the State Board of Agriculture is to-day as much of an educational school as any college within its confine. I believe that the State of Indiana will receive as much benefit from assistance rendered to the State Board of Agriculture, and placing honest, earnest and intelligent men on its board, as from any other branch in the State of Indiana. I am glad that their display is made in the Capital City. It brings together all classes in the State of Indiana, and from other states, who come here and give her praise. I know of conventions that have been held in Indianapolis of men from the far east, the north, west and south, who have said: "I did not know that there was such a city in the State of Indiana. I was surprised at the quality of the streets, the number of churches and the intelligence of the people." Indiana had been classed as one of the wild and woolly western states, and they were surprised on coming to the Capital City and seeing it. I say to you that I believe that the advancements made in Indiana through the efforts of the Board of Agriculture in all its departments has done as much in an educational way to help Indiana as any other branch in the State.

Without detaining you any further, for some one might question my ability as a farmer and ask me some questions, I wish to extend you a welcome to the city of Indianapolis, and hoping that your meeting may be a success, I bid you good-morning.

President Hamilton. The next thing on the program is an address from our Governor, Mr. Matthews. I will appoint

James E. McDonald and Charles B. Harris to see the Governor and ask him to come in. If you do not find the Governor, get Mount.

Gentlemen, I suppose it is hardly necessary to introduce you to Governor Matthews, who will give us a little talk.

Governor Matthews.

Mr. President and Gentlemen of the Delegate Board of Agriculture:

I have been taken a little by surprise this morning just as I came into the building upon the very hearty and cordial invitation of the Secretary of the State Board of Agriculture, supplemented by that of the President. I had stated that through the multiplicity of duties just at this time I had scarcely been able for the last three weeks to tell whether I was standing on my head or my heels, but I could not resist when Mr. McDonald and Mr. Harris invited me in to see the finest body of men that ever assembled in the State of Indiana. I know of no class of persons representing the greatest interests in the State to whom I could extend a more cordial welcome, and to whom I could give a warmer and more sincere welcome than to the representatives of this agricultural board. I have not had time to give much thought to that which I should say in connection with a formal address. This is purely an informal affair. I want to welcome you, gentlemen. You have got some important business to transact. There are responsibilities placed upon you which I hope you will meet as they should be met. I am decidedly in favor that the interests of the State Board of Agriculture shall be represented by agricultural interests alone; that is, that farmers of this State should not only compose the State Board of Agriculture, but should absolutely run it. When that has been the case, I believe that the State Board of Agriculture has met with greater success than at other times. I welcome you, gentlemen, and wish for you not only a pleasant and interesting meeting, but a decidedly successful one. Thank you.

President Hamilton. The next thing in order will be the roll-call of counties. The delegates will please come forward and hand in their reports. Now, gentlemen, let us have order.

Secretary Kennedy. I did not catch the remarks of the President while he was talking, but at the close of the reading of this report I will expect every delegate to file his report, which will be submitted to the Committee on Credentials, who will meet between this and 2 o'clock. So you will please file your reports (Roll-call read.)

Secretary Kennedy. Please file your certificates so that they may be in the hands of the committee.

Vice-President McDonald assumes the chair.

Vice-President McDonald. We will now listen to the address of the President of the Board.

President Hamilton. When I wrote this address that I am about to read to you I expected there would be about forty or fifty ladies in the room, so you will see why I thus address you.

ADDRESS OF PRESIDENT W. W. HAMILTON.

Ladies and Gentlemen, and Fellow Members of the State Board of Agriculture:

1. We are again met in annual convention and are here for the discussion of all questions pertaining to our interest and for the interest of all citizens of the great State of Indiana, and to hear the reports of those who are officially connected with the Board during the year.

2. We are here representing more capital, employing more labor, paying into the counties and State more taxes, and producing more wealth than all the other industries of the State combined.

3. The great sale of cattle, horses, mules, hogs and sheep fed from the products of the soil, together with the enormous crops turned into money through other channels, amount to millions of dollars as our statistics show.

4. I fear this fact was overlooked by many who might have given encouragement and financial aid, especially the citizens of our capital, who we thought would unite with us, for State and city pride.

5. We are proud to say our Fair was a success in every department, and had the rains not interfered, would have been financially successful.

6. The receipts and expenses will be given in the reports of the Secretary and Treasurer.

7. I recommend the appointment of department superintendents as soon after the January meeting as possible, and that they be furnished with the last report of the department they are to have charge of, they to revise the same and return it with the report to the Secretary in time for the Executive Committee to prepare same for the premium list.

(I will just here, gentlemen, say to you that I recommend as your Chairman, that the President be allowed to select his own Executive Committee. The Executive Committee of four is to act with him during the executive meeting of the Board, and it would be agreeable to him that he chose his own committee. This is a recommendation I make that will come up to you hereafter.)

8. I also recommend that the members of the Board be frequently changed, and that the President be eligible for one year only. We have many good men in the State who have never been on the Board; where would David the stone slinger been had not Samuel asked, "Jesse, hast thou not another son?"

9. Nine county fairs in the State are held during the week of the State Fair; therefore I suggest, the State Board, and especially the members in whose districts these fairs are held, use their influence and induce the representatives of these counties, to join with the other counties in the State industrial exhibits.

10. The Board should not, under any circumstances, permit unlawful or immoral vices on the grounds, during the Fair or at any time.

11. I suggest that all useless shows be left out entirely, that the visitors have nothing to prevent them from spending their time viewing the exhibits. Our fairs are not held for side shows, but to exhibit the industries of our people, to advance merit, and to create zeal in labor and skill.

12. We do not permit such exhibits as are given in some of our city theaters, but should be willing to secure a good, moral entertainment, to which we can take our wives and daughters.

13. A building should be provided on the fair grounds for the Farmers' Institute, that the same may be held every day during the Fair.

14. The delegate board are the electors (in the broad sense of the word) who choose annually the members whom they trust to manage the State Fair for the people of the State.

15. I suggest to the delegates that the selection and election of members of the State Board of Agriculture be men competent and eminently qualified by education and experience to fill the place. It is a very great mistake to place men in office who do not realize the responsibility they undertake, and make a failure.

16. The present Board and officers has proven to be a good one in every way, each one doing his part well.

17. Each State Board improves and is more capable than its predecessors. I recommend that the Secretary and Treasurer be one person, and that the Board select a suitable person of their number to collect the money fair week; and all money be placed in a bank selected by the Board, and be paid out only on warrants drawn by the Secretary and endorsed by the President.

18. I suggest that the Board take charge of soliciting advertisements for the premium list. My reason for this is that the Board may solicit special premiums as advertisement, which would encourage and increase the exhibits and attendance. Some States have offered several thousand dollars in special premiums.

19. I also recommend abolishing the office of Sanitary Commissioners, retaining the State Veterinary as the competent one to decide such cases. What would you say, or think, if the county would furnish two or three able-bodied men to assist the county doctor to decide what was the disease the county charge was afflicted with?

20. I recommend that no doubtful contracts be entered into, by this means avoiding litigation.

(I will just stop here and say, gentlemen, that I will recommend to this Board that they rarely ever make a contract, even with a corporation, because we get into a lawsuit and we have trouble, as this Board knows.)

21. We want the State to give all the aid necessary to Purdue University, as it is the only school I know of in the State where a young man can receive a college education without spoiling him for a good farmer.

22. The Farmers' Institutes should also be encouraged by State aid, for the farmers (the producers) are greatly benefited by attending the meetings; they learn to tell what they know about farming, and learn from others what they have gained by experience and observation.

Mr. Howland. Mr. President, I move that the address of the President be referred to a committee of five to be appointed by the Chair and report to this meeting.

Motion carried.

The Chair will appoint upon that committee :

H. B. Howland, of Marion County.

Aaron Jones, of St. Joe County.

W. W. Morgan, of Montgomery County.

W. L. King, of Rush County.

Albert Tyner, of Hancock County.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Your Committee on President's Address begs leave to submit the following :

We recommend that that part of the seventh paragraph relating to the abolishment of the February meeting of the State Board be stricken out, as it conflicts with the law creating the State Board of Agriculture.

We think that the recommendations in paragraph 17 are unwise and should not be adopted, as we think it would remove a safeguard to the association.

We regard the suggestions in paragraph 18 as impracticable.

While paragraph 19 represents the views of our President, we think it unwise to make such sweeping changes of the law without further trial.

Signed by the committee,

H. B. HOWLAND, Chairman,
AARON JONES,
W. W. MORGAN,
W. L. KING,
ALBERT TYNER,
Committee.

On motion the adoption of the report of the committee was carried without dissent.

Mr. Downing. Mr. President, I move that those corrections be made on that before it is given to the papers and the public.
Carried.

President Hamilton. Now, gentlemen, any of the delegates who claim to have a right to vote here, will go into the adjoining room and see the Committee on Credentials.

Mr. Lagrange. Mr. President, permit me to ask, has there been a Committee on Credentials appointed?

President Hamilton. No, I am going to appoint them now. The Committee on Credentials will consist of James E. McDonald, of Noble County; C. W. Worrall, of Monroe County, and A. E. Nowlin, of Dearborn County.

President Hamilton. Gentlemen, let us have order for a moment. We will appoint the Auditing Committee. I will appoint as Auditing Committee Aaron Jones, of St. Joseph County; Charles Downing, of Hancock County, and M. S. Claypool, of Delaware County, who will prepare to report after dinner. Now gentlemen, we will hear the report from our Secretary.

REPORT AND SUGGESTIONS OF SECRETARY OF THE INDIANA STATE BOARD OF AGRICULTURE FOR 1896.

I offer as a reason for departing from my custom in former years, of confining my report to a financial statement of the affairs of the Board, and offering suggestions, that this is the time of all others when I can come into contact with fair managers throughout the State and that much that I shall say will apply as well to county and district fairs. Proceeding upon the theory that all fairs are conducted primarily for the propagation of new ideas and the display of new things, and that here the result of thought and toil can touch the fertile mind, I insist that in the arrangement of premium lists more attention should be given to new articles and new breeds of animals. As our lists are now printed, we invite into competition articles, not strictly speaking, antediluvian, but so much out of date that they are to-day not in use, because they are superseded by new and more attractive articles. To be well understood, let me speak specifically of the various classes in the art department, as provided by our list. I assert that one-third, if not indeed a greater per cent. of the articles exhibited, are not in common use, and this because they antedate the times. I would offer no inducement for the exhibition of any article that an up-to-date housewife would not give place in her tidy room. Give the money thus squandered to "The New," and let the cry that articles will, because they have been there so often before, recognize the annual visitor in these departments, cease. The number of articles exhibited may be reduced, but the quality will invite the visitor to return next year, and he will go home telling of the magnificence of our exhibition rather than to discourage newcomers with the remark, "Its the same old show." What is true of this part of the fairs is true to a greater or less extent of every department.

In the live stock department the rules need revision. A rule that is in the book and for any reason is ignored by either exhibitor or manager, only tends to weaken

every other rule and breeds indifference to all requirements. Such rules should be quickly abandoned. The rule, then, that requires that stall rent should be paid before the animal is assigned a stall, should be repealed and in its stead a rule that would prevent an animal being exhibited before the rent is paid, enacted, and then enforced. This is one of the features of the speed department that is always enforced, and is the rule that was enforced in one department of the State Fair this year with most excellent results.

As has been indirectly referred to by our worthy President, a fair is often and nearly always estimated by the number in attendance. There is not time to enter into a discussion of the justice of this verdict, but because it is so, it becomes us to provide for this immense attendance. I assert that the trouble is not because the exhibition lacks merit, it is not because the exhibition is not known to be on or where it is being held, it is not chargeable either to manager or exhibitor, but very largely to the provisions made to bring the masses to the city and return them at a seasonable hour. The mere announcement that a low rate will prevail for the season does not attract the attention of the public sufficient to stimulate them to action, while, if the Big Four Railroad, for example, would advertise that on Wednesday morning of the State Fair, a State Fair excursion would leave Muncie at 7 A. M., the tickets good for two days, and that on Thursday the same train would start from Union City at 6 A. M., and that on returning these trains would leave the city at 7. If this would be the rule on every line of railroad that crosses the Belt Railroad into the city of Indianapolis, I promise the railroads, the city and the State Fair managers that they will be called upon to entertain more people than they have in any two, if not three, of the preceding years. All this I think possible and hope to see it accomplished this year.

I appeal to the Secretaries of Fairs for a closer and more thorough cooperation. Let every Secretary feel that to help a Secretary of a neighboring Fair secure exhibits and general patronage will return to him with good interest and bring good results to the business we are conducting and the interests we are fostering. A complete and classified list of all the exhibitors of the State should be compiled each year. How much a copy of this will help a Secretary to properly distribute his lists, and how much it will educate exhibitors to enter new fields when they shall receive these lists.

Time forbids that I should extend my remarks, and I proceed with the financial statement of the affairs of the Board.

RECEIPTS CLASSIFIED.

Amount on hand last report	\$1,913 60
Received from rents	520 40
" " privileges	2,498 88
" " stall fees	1,028 00
" " entry fees	2,645 00
" " exhibitors' tickets	450 00
" " admissions	13,027 85
" " miscellaneous	56 75
" " State	10,000 00
	<hr/> \$32,135 48

DISBURSEMENTS.

Per diem and mileage	\$2,112 70
Salaries	2,963 57
Postage, telegrams and express	441 97
Printing and stationery	649 10
Advertising	2,021 94
Construction and repairs	1,286 89
Banking, interest and rentals	3,164 80
Insurance	135 00
Furniture and tools	135 33
Claims of past years	378 29
Miscellaneous	693 56
Expense of exhibition	3,707 94
Premiums	14,817 17
	<hr/> \$32,508 26
Amount overpaid	<hr/> \$372 78

WARRANTS NOW OUTSTANDING.

No. 1346.	Reuben Bunnell	Issued in 1893 . .	\$0 50
No. 1410.	Ida Thompson	" " 1893 . .	2 50
No. 622.	Rockville Tribune	" " 1894 . .	1 25
No. 1545.	Westfield News	" " 1895 . .	1 00
No. 1735.	James Riley	" " 1896 . .	42 00
No. 2324.	S. C. Curtis	" " 1896 . .	4 00
No. 2326.	Indiana Paper Co	" " 1896 . .	10 53
No. 2327.	Austin & Tripp	" " 1896 . .	1 50
No. 2328.	James Fesler	" " 1896 . .	5 00
No. 2329.	Rider Engine Co	" " 1896 . .	5 00
No. 2330.	Joseph Gardner	" " 1896 . .	3 96
No. 2333.	Wm. Hussong	" " 1896 . .	6 00
No. 2334.	Inland Poultry	" " 1896 . .	4 00
No. 2335.	Indianapolis Tribune	" " 1896 . .	15 00
No. 2336.	Indpls. Tent and Awning Co.	" " 1896 . .	14 00
No. 2337.	American Sportsman	" " 1896 . .	13 00
No. 2340.	The Horseman	" " 1896 . .	47 60
No. 2342.	Breeders' Gazette	" " 1896 . .	39 20
No. 2350.	Lilly & Stalnaker	" " 1896 . .	184 33
No. 2370.	Harvey Stearn	" " 1896 . .	29 17
		<hr/>	\$379 54

ANNUAL MEETING.

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CLAIMS NOW DUE.

American Trotting Association	\$75 00	
Indianapolis Gas Co	113 00	
Western Horseman.	148 63	
Central Union Telephone Co	35 00	
Hide, Leather and Belting Co.	3 91	
W. W. Morgan.	13 00	
Robert Zenor	1,435 94	
Horse Review	52 50	
	<hr/>	\$1,876 98

CREDITS UNCOLLECTED.

Indianapolis Driving Club	\$1,300 00	
E. P. Fuller.	50 00	
Willis P. Graves.	86 00	
Suspensions	225 00	
I., D. & W. R. R.	259 00	
	<hr/>	\$1,920 00

FAIR RECEIPTS AND EXPENDITURES.

September 14, admissions, gates	\$9 50	
September 15, admissions, gates	404 50	
September 16, admissions, gates	1,802 00	
September 16, admissions, grand stand	199 45	
September 17, admissions, gates	7,457 75	
September 17, admissions, grand stand	847 60	
September 18, admissions, gates	2,064 25	
	<hr/>	\$12,785 05
Special admissions		242 80
Exhibitors' tickets		450 00
		<hr/>
Total admissions.		\$13,477 85
Receipts from privileges	\$2,493 88	
Receipts from stall rent.	1,028 00	
Receipts from entry fees	2,645 00	
	<hr/>	6,166 88
		<hr/>
Total receipts		\$19,644 73

EXPENSES OF FAIR.

Paid in premiums	\$14,817 17	
Expense of exhibition	3,707 94	
Postage, telegrams and express	441 97	
Printing.	290 35	
Advertising	2,021 94	
	<hr/>	21,279 37
		<hr/>
Net loss on Fair		\$1,634 64

PROPERTY STATEMENT.

Value of eighty acres and improvements	\$145,000 00
Value of improvements on leased land	10,000 00
Sprinkling wagon	200 00
6,000 chairs	1,000 00
Engine and pumps	250 00
Furniture and fixtures	200 00
Uncollected credits	1,920 00
Total	\$158,570 00
Unpaid claims	1,824 48
Net value of property	\$156,745 52

Respectfully submitted,

CHAS. F. KENNEDY,
Secretary.

President Hamilton. Gentlemen, the next thing in order will be Ed Robison's report—our Treasurer.

TREASURER'S REPORT.

E. J. ROBISON, TREASURER B. B. OF A., JAN. 4, 1897.

RECEIPTS.

1896.		
Jan. 14.	Cash balance brought forward	\$2,244 69
April 8.	State appropriation	10,000 00
Sept. 14.	Ga'e receipts	12,785 05
Sept. 19.		
Sept. 14.	Receipts from C. F. Kennedy, Secretary . . .	7,436 83
Dec. 31.		
		\$32,466 57

DISBURSEMENTS.

Warrants paid, issued 1894	\$25 00
Warrants paid, issued 1895	300 84
Warrants paid, issued 1896	32,133 67
Balance on hand	7 06
Total warrants paid	\$32,459 51
	32,466 57

Outstanding warrants: 1893, Nos. 1346, 1410; 1894, No. 622; 1895, No. 1545; 1896, Nos. 1735, 2324, 2326, 2327, 2328, 2329, 2330, 2333, 2334, 2335, 2336, 2337, 2340, 2342, 2350, 2370.			\$379 54	
			<hr/>	\$32,839 05
Total amount of receipts			\$32 466 57	
Amount of overdraft, after outstanding warrants are paid			372 48	
			<hr/>	\$32,839 05
				<hr/>

Respectfully submitted.

January 5, 1897.

President Hamilton. Mr. Peed, General Superintendent of the Board, will submit his report.

REPORT OF GENERAL SUPERINTENDENT.

E. H. PEED, GENERAL SUPERINTENDENT.

Mr. President and Gentlemen of the State and Delegate Board of Agriculture:

In making this, my annual report as General Superintendent for the past year, will say that in the past year there has been but very little improvement on the grounds. It was thought necessary to brace the cattle and show horse barns. We also reset all shade trees that had died in the last two years. We also found the roof on the art building in bad shape, which we repaired as best we could. We had a storm during the summer that blew down and damaged some of our smaller buildings, which was repaired. That, with the work that naturally follows, was all that was done on the grounds. On visiting the grounds yesterday I found everything in the very best condition, and as I had not been on the grounds since the week after the Fair was pleased to find everything in such good order. An itemized account of receipts and expenditures will appear in the Secretary's report. The amount received for hay was \$243; Driving Club, \$200; rent of barns, \$26; picnic, \$225. The dividing the duties of General Superintendent and making a Superintendent of Privileges I think a wise move and would recommend its continuance. I thank the officers and each member of the Board for their kind treatment.

President Hamilton. Now, gentlemen, the Committee on Credentials will report shortly after noon. It is now in order to place in nomination eight candidates from the districts which will be read by our Secretary.

The Secretary proceeded with the roll-call of districts in which vacancies occur, and the following nominations were made:

FIFTH DISTRICT.

H. L. Nowlin, of Dearborn County; Robert H. Wood, Jefferson County.

SIXTH DISTRICT.

John Childs, Decatur County; W. H. Robbins, Decatur County;
Knode Porter, Wayne County; O. M. Smith, Rush County;
H. F. McMahan, Randolph County; Jesse Stevens, Wayne County.

EIGHTH DISTRICT.

Charles Downing, Hancock County; John Kircheval, Hamilton County.

NINTH DISTRICT.

James M. Sankey, Vigo County.

Mr. Mitchell. Will the Board permit just a word? I was at one time permitted to be associated with ex-Governor Williams as a member of the Board, and appreciated very highly the honor to be associated with him and I now feel—while not a member of the Board—that it would be a similar honor to be associated with an ex-Governor, and I therefore put in nomination the Hon. Claude Matthews.

Mr. McDonald. I am authorized by Governor Claude Matthews to say that he appreciates very much the position as a member of this Board, but that his duties for the next year are so arduous that it will be utterly impossible for him to give any attention to it whatever; that at some time later, possibly one or two years from now, he would very gladly become a member of the Board, but he can not become a member at this time.

TENTH DISTRICT.

John L. Davis, Montgomery County; John Morgan, Hendricks County;
John W. Robe, Putnam County; A. L. Howard, Boone County.

ELEVENTH DISTRICT.

M. S. Claypool, Delaware County.

TWELFTH DISTRICT.

W. M. Blackstock, Tippecanoe County; Mortimer Levering, Tippecanoe County;
W. H. Goodwine, Warren County.

THIRTEENTH DISTRICT.

John L. Thompson, Grant County.

Secretary Kennedy. This completes the list of all of the districts in which we have expiring members.

President Hamilton. It will not be too late to make nominations until we go into election, which we will do at 2 o'clock.

President Hamilton. Gentlemen of the convention, would you like to hear the Department Superintendents' reports from each one? Do you want to hear them read?

Mr. President, I move you that they be filed with the Secretary and published in his report.

Carried.

Is there anything that the Board wishes to take up for a few minutes. If not, we will adjourn.

Mr. Harris. I have a resolution which I want to present to the State and Delegate Board:

We believe that the Secretary of Agriculture should be in touch with the farmer, the gardener, the stock raiser and the dairyman, and as President-elect McKinley is soon to name a person for that exalted position; therefore be it

Resolved by the Indiana State and Delegate Board, That we recommend to the President-elect, the name of our distinguished fellow citizen, the Honorable Aaron Jones, as a person eminently fitted for the position of Secretary of Agriculture, and earnestly request that he be appointed to such position.

Mr. Harris. I move the adoption of the resolution.

Seconded by Mr. Stevens. Motion prevailed.

Mr. President. It is over an hour until lunch time, and I think as we are to hold a one day session, and there are some resolutions to be presented, I ask that you maintain order and ask that these resolutions be presented.

President Hamilton. We are now ready to hear resolutions.

Mr. Howland. This is a resolution offered by the Horticultural Society of this county :

WHEREAS, The common or bull thistle, the wild lettuce, the teasle, the jimson and other obnoxious and injurious weeds that are so rapidly spreading over the farms and highways of our State, greatly to the detriment of the farming interest as well as to the health of our people; therefore, be it

Resolved by the State and Delegate Board of Agriculture now in session, That as representatives of the farming interests of the State, we demand that the Legislature about to convene, shall at this session so amend the law enacted to prevent the spread of the Canada thistle as to cover and include the noxious weeds named in the foregoing preamble.

Mr. Howland. I move the adoption of the resolution I have just finished reading.

Motion prevailed.

Mr. Mitchell. Gentlemen of the Delegate Board, I want to offer the following resolution. You are all aware that the State Board ought to be the center about which all other agricultural interests ought to circle :

As the years come and go it is evident to all progressive agriculturists that the State Board of Agriculture ought to be at the head of all agricultural work in the State, and everything ought to be done to strengthen its efforts. Our State Legislature has been generous in meeting the wants of the Board by appropriations. After years of experience in institute work in the State, and examining into the systems in successful operation in the States of Illinois, Wisconsin, Michigan, Ohio and Pennsylvania, I find their Farmers' Institute work is all under the supervision of the State Boards of Agriculture named; therefore,

Resolved by this Delegate Board of Agriculture, That we ask the present Legislature at this session to so amend the law creating the Farmers' Institute as to place the management of the institute work in the State under the care and supervision of the State Board of Agriculture.

Respectfully submitted by

ROBERT MITCHELL.

Mr. Mitchell. My object in presenting this resolution is this: My interest in the Board does not stop with my retirement from that Board. Last year I had occasion to go into Illinois, and I met with the farmers of Illinois in their institute work. Each member of the State Board of Agriculture in Illinois took

charge of the work in his district and gave it his personal supervision, and I saw it was a better way, because it was managed under the direction of the State Board of Agriculture, which gave two weeks of its time, and I think it was better than all other States, because under the management of their State Board of Agriculture. If a man is elected on the State Board of Agriculture and does not give it the attention you have the remedy of removing him. You can say, "Here, you will have to do better work." I move the adoption of this report.

Mr. Lockhart. I ask the privilege of seconding and just to say a few words as an old member of the State Board of Agriculture. I am not now a member, but having been on its Board, I am still interested in its work. Many of the gentlemen know that I was the originator of holding meetings in the State of Indiana. Many of the older members know the fact that during the three or four years that I was a member that the work was a great success in the State. I am not on this floor for the purpose of criticising the work under Prof. Latta, for I think he is doing a great work, but I think and believe that the interest would be greater if it were in the hands of a member of the State Board of Agriculture. I am acquainted with the work in Ohio, and know of counties that have three or four, and some of them five, Farmers' Institutes under the direction of the State Board of Agriculture of the State of Ohio. I heartily second the motion presented to the State Board of Agriculture by my friend Mitchell.

The motion carried unanimously.

President Hamilton. Is there any other miscellaneous business? If not, we will go on with the resolutions.

President Hamilton. You will please give attention. The Committee on Finance will make its report to you.

INDIANAPOLIS, January 5, 1897.

To the President and Members of the Delegate Board:

Your committee heretofore appointed to examine the books, vouchers and reports of the Secretary and Treasurer, have performed that duty by checking up all

receipts and expenditures, and find the books correctly kept and clearly setting out in detail the various sources of receipts and expenditures, and find them correct, and the reports a correct statement from the books. Respectfully submitted,

AARON JONES,
M. S. CLAYPOOL,
CHAS. DOWNING.

President Hamilton. You have heard the report. What do you want to do with it?

Mr. Sankey. I move that the report be received and the committee discharged. Motion carried.

President Hamilton. The Committee on Credentials will now make their report.

REPORT OF COMMITTEE ON CREDENTIALS.

Member 1st District	John C. Haines
Member 2d District	Mason J. Niblack
Member 3d District	W. W. Stevens
Member 4th District	J. W. Lagrange
Member 5th District	V. K. Officer
Member 6th District	W. W. Hamilton
Member 7th District	H. B. Howland
Member 8th District	Charles Downing
Member 9th District	James M. Sankey
Member 10th District	John L. Davis
Member 11th District	M. S. Claypool
Member 12th District	Wm. M. Blackstock
Member 13th District	John L. Thompson
Member 14th District	Charles B. Harris
Member 15th District	Aaron Jones
Member 16th District	James McDonald

COUNTY FAIRS.

Boone	C. W. Scott
Brown	A. Pricefield
Cass	Cott Barnett
Clinton	Robt. Carrick
Dearborn	A. E. Nowland
Decatur	J. F. Childs
Delaware	Chas. H. Anthony
Dubois	E. W. Pickhardt
Elkhart	W. C. B. Harrison

Gibson	Robt. Mitchell
Grant	H. G. Hammaker
Greene	A. T. Hert
Hamilton	Daniel McHare
Hancock	Elbert Tyner
Harrison	Henry Wright
Hendricks	John Morgan
Henry	R. H. Cooper
Howard	Ed. Sweeney
Jackson	W. A. Price
Jefferson	V. K. Officer
Jennings	J. B. Smith
Johnson	S. W. Dungan
Knox	J. S. McCoy
Lagrange	Norman Babcock
Lake	A. A. Bibler
Laporte	Wm. C. Bush
Lawrence	Geo. W. McDaniel
Marion	H. B. Howland
Monroe	C. R. Worrall
Montgomery	Milton B. Waugh
Noble	Orlando Kimmall
Owen	L. Downey
Pike	J. S. McCoy
Putnam	J. C. Bridges
Randolph	D. E. Hoffman
Ripley	T. W. W. Sunman
Rush	W. O. Waltson
Shelby	John M. Vanoy
Spencer	J. C. Haines
Steuben	H. L. Hudson
St. Joseph Horticultural Society	Christian Holler
Tippecanoe	W. M. Blackstock
Union	Allan Beeler
Vigo	W. T. Beauchamp
Warren	M. A. McDonald
Washington	E. Hobbs
Wayne	Knode Porter

DISTRICT FAIRS.

Boswell	M. A. McDonald
Batesville	T. W. W. Sunman
Bridgeton	W. W. Morgan
Covington	M. A. McDonald
Bristol	H. S. K. Bartholomew

Grange Jubilee	D. P. Monroe
Kendallville	J. S. Canlogue
Kentland	Patrick Keefe
Middletown	Frank A. Wischart
Richmond	Walter S. Ratliff
South Bend	Christian Holler
Waterloo	R. M. Lockhart
Warren	J. W. Beard
Wayne Horticultural Society, Centerville	Jesse Stevens
Swayzee	E. C. King
Clay County Fair, Clay City	W. H. Guirl
Elwood D. P. Fair Association	D. G. Evans
Newtown Fair Association	W. W. Morgan

———. I move the adoption of the report of the Committee on Credentials.

Motion prevailed.

President Hamilton. Gentlemen of the convention, the next thing in order is the election of members of the Board. I will appoint as tellers C. R. Worrall, of Bloomington, and George McDaniel, of Bedford. The tellers will prepare themselves. The secretary will call the names of nominees from the Fifth District.

The Secretary. The candidates for membership in the Fifth District are H. L. Nowlin, Dearborn County; Robert H. Wood, Jefferson County.

FIRST BALLOT.

Nowlin	40
Wood	21
Total	61

The President. Mr. Nowlin having received a majority of all the votes, is elected from the Fifth District for the next two years. The Secretary will call the names of candidates from the Sixth District.

The Secretary. The candidates from the Sixth District are John Childs, Decatur County; W. S. Robbins, Decatur County; O. M. Smith, Rush County; Knobe Porter, Wayne County; Jesse Stevens, Wayne County; H. F. McMahan, Union County.

FIRST BALLOT.

Childs	7
Robbins	5
Smith	6
McMahan	7
Porter	20
Stevens	15
Total	60

The President. There being no election, the delegates will prepare for the second ballot.

SECOND BALLOT.

Childs	5
Robbins	3
Smith	3
McMahan	3
Porter	34
Stevens	19
Total	67

The President. Mr. Porter, having received a majority, is elected for the next two years from the Sixth District.

Senator Holler. I move that Mr. Jones be instructed to cast my vote.

Consent.

The Secretary. The candidates from the Eighth District are Charles Downing, Hancock County; John H. Kercheval, Hamilton County.

FIRST BALLOT.

Downing	45
Kercheval	17
Total	62

The President. Mr. Downing having received the greatest number of votes I declare him elected for the next two years.

Mr. LaGrange. There being but one candidate from the Ninth District, I move that the Secretary cast sixty-one votes for him.

Carried.

The Secretary. I cast sixty-one votes for James M. Sankey for member of the Ninth District for the next two years.

Mr. Sankey. I thank you for your votes and promise to give my best attention to the State Board work.

The Secretary. The candidates from the Tenth District are John L. Davis, Montgomery County; John W. Morgan, Hendricks County; John W. Robe, Putnam County; A. L. Howard, Boone County.

Roll-call.

FIRST BALLOT.

Robe	10
Davis.	40
Morgan.	5
Howard.	7
Total	62

The President. Mr. Davis, having received the majority, is declared elected from the Tenth District for the next two years.

Mr. Chairman, I move that the Secretary be authorized to cast the entire vote for Mr. Claypool.

Consent.

The Secretary cast 62 votes for Mr. Claypool.

The President. I declare Mr. Claypool elected for the next two years from the Eleventh District, he having received all the votes of the convention.

The Secretary. The candidates from the Twelfth District are W. M. Blackstock, Tippecanoe County; Mortimer Levering, Tippecanoe County; W. H. Goodwine, Warren County.

Roll-call.

FIRST BALLOT.

Blackstock.	31
Levering	20
Goodwine	19
Total	70

The President. No election. Prepare for new ballot.

SECOND BALLOT.

Blackstock	30
Levering	21
Goodwine	13
Total	64

THIRD BALLOT.

Blackstock	31
Levering	23
Goodwine	9
Total	63

FOURTH BALLOT.

Blackstock.	35
Levering	22
Goodwine	8
Total	65

The President. Mr. Blackstock is therefore declared elected.
Mr. Sweeney. I would like to have it explained how it happens that there have been 65 votes cast on this ballot and there never has been but 62, and there are two members gone.

The President In the absence of a question of the vote the chair will declare Mr. Blackstock elected.

Mr. Sweeney. I am simply asking for an explanation as to how there could be 65 votes and there are two absent.

The President. The list shows 66 voters in the room.

Mr. Sweeney. Mr. President, I insist upon my question of personal privilege that the vote shall be verified by calling the roll and checking the vote as called.

Carried.

The President. Now the clerk will call the roll to see if there are 65 voters in the room. If not the vote will be declared void.

Roll-call.

The President. The call of the roll shows 55 voters in this room. I therefore declare the vote just taken void and order

another ballot. Mr. Goodwine wishes to return his thanks to the gentlemen who voted for him and says he desires to withdraw from the contest.

The name of Mr. Goodwine is withdrawn.

Mr. Sweeney. I want to ask a question as to whether this is absolutely correct. It is about train time and there are lots of men who voted and went right off. I question whether you are doing these gentlemen justice.

The President. The Chair has ruled and has ruled with the object of doing all of these men justice. We want no man's right to an office questioned or the ballot of this association questioned.

Mr. Sweeney. How are you going to know when you don't know how many left the room?

The President. The question raised was this, that there never, until this ballot, had been but 62 ballots cast.

———. I move you that there be 55 votes cast in this ballot, unless some member who is legally entitled to vote comes into the room.

The President. The Chair will rule that out, for the reason that any member whose name appears on this paper is entitled to vote, and every man who votes on this ballot will come to this desk and deposit his vote in the hat.

Moved that there be an inspector appointed to receive the ballot from the hand of the voter, and so declared.

Roll-call.

FIFTH BALLOT.

Blackstock	27
Levering	30
	<hr/>
Total	57

The President. I therefore declare that Mr. Levering has received the largest number of votes, and is elected to represent this district.

Mr. Cowgill. I desire to place in nomination E. W. Powell, of Wabash County, as a member from the Thirteenth District.

The right to nominate at this time was questioned, and the Chair declared the nomination in order.

The President. The candidates from the Thirteenth District are E. W. Powell, Wabash County; John L. Thompson, Grant County.

Roll call.

FIRST BALLOT.

Powell	7
Thompson	55
Total	<hr/> 62

The President. I declare Mr. Thompson elected as a member from the Thirteenth District.

Mr. Chairman. What is the further pleasure of the gentlemen?

Moved and seconded that the Delegate Board adjourn *sine die*.
Which motion prevailed.

W. W. HAMILTON,
Chairman.

CHAS. F. KENNEDY,
Secretary.

INDIANA STATE FAIR, 1897.

REPORTS OF SUPERINTENDENTS AND LIST OF AWARDS.

DEPARTMENT A.

REPORT OF SPEED DEPARTMENT, 1897.

M. S. CLAYPOOL, Superintendent.

Mr. President, Members of the State and Delegate Boards of Agriculture:

For several years past the turf journals of the country have had a great deal to say about shorter races, until the patrons of the turf have become impressed with the idea that a change might prove beneficial.

Various opinions and ideas have been advanced as to the best way of giving races, but they have assumed no definite shape; no society cared to take the initiatory steps.

We undertook the experiment this year of making our races "Two in Three," and no race to be longer than four heats, and if not decided at the end of the fourth heat, to settle on the summary. The conditions were most unfavorable for the trial. The fields of starters were large, and at no time were we able to use the entire track, on account of rain, so that we are unable to judge fairly of the merits of shorter races.

The public perhaps would rather see new fields of horses, but we believe better satisfaction can be obtained for all horse men and public by having races "Three in Five" and no race longer than five heats. That would avoid long races and the fields could be handled with more satisfaction.

It is very gratifying to be able to report a large list of entries and to make a good financial exhibit.

The statement for this Department shows:

RECEIPTS.

From entry fees	\$2,500 00
From 5 per cent. from winners	800 00
From grand stand	1,047 05
Total	<hr/> \$4,367 05

DISBURSEMENTS.

For purses (one-half of the program only being completed)	\$4,000 00
Net credit balance	\$387 05

Now that the lease of the track has expired, it should be placed in good hands and proper implements furnished for the proper working of so valuable a property. I desire to call the State Board's attention again to the necessity of an office at the stables for the use of the Superintendent.

The total expense of the Department was \$155.

REPORT OF RACES.

F. A. BOLSER, Starting Judge.

W. W. MORGAN,	} Judges.	C. H. ANTHONY,	} Timers.
C. R. WORRALL,		A. W. POWELL,	
GEORGE W. HALL,		J. N. DICKERSON,	

M. S. CLAYPOOL, Clerk of Course.

All races mile heats, two best in three, race to be concluded with fourth heat.

AWARDS.

TUESDAY, SEPTEMBER 15.

2:30 Trot. \$500 divided—\$250, \$125, \$75 and \$50.

Monte Cristo, b. g.	2	1	1
Axtelletta, g. m.	1	4	8
Virginia Belle, b. m.	3	2	4
Celibate, br. s.	4	3	2
Nibbs, b. g.	5	5	5
Lady Jubilant, b. m.	7	6	7
Mero, b. m.	8	7	6
Oakley, b. g.	6	8	8
Alta S., b. m.	dis.		
Rose L., c. m.	dis.		

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat	:36½	1:12	1:47	2:22½
Second heat	:36	1:11	1:46	2:22½
Third heat.	:35½	1:09½	1:44½	2:20½

2:23 Pace. \$500 divided—\$250, \$125, \$75 and :50.

Namo, b. m	1	1
Bertie W., c. h.	2	4
Red Elgin, b. h	4	2
Helen P., b. m	3	6
Glenview, c. g	6	3
Belle West, b. m	5	5
Ada, bl. m	7	9
Ora, br. m	11	7
Nutboy, c. h.	12	8
Belle Crawford, s. m	9	11
D. M. B., bl. g	10	10
J. W. S., b. g	8	dis.
Kokomo, b. g	dis.	
Arlene Wilkes, c. m	dis.	
Belle Easton, r. m	dis.	
King Redmond, s. h	dr.	

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat	:33½	1:07	1:40¾	2:15½
Second heat	:33¾	1:08	1:42	2:17½

2:14 Pace. \$500 divided—\$250, \$125, \$75, \$50.

May Centlivre	1	1
Reuben S	3	2
Celiffmont, c. h	2	6
Nellie F., b. m	5	3
Easter Belle, b. m	6	4
Bully Boy, b. h	4	10
Madge D., b. m	7	5
Mariette Wilkes, c. m	9	7
Bessie B., b. m	12	8
Chief Justice, b. h	14	9
Baccillus, c. g	10	14
Johnny B., b. g	11	11
May Hal	17	12
Peter Piper	13	13
Blinkey Morgan	8	Dis.
Warren C, b. h	15	Dis.
Alhambra, bl. h	16	Dr.

TIME.

	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat	:32½	1:05½	1:38¾	2:13½
Second heat	:33	1:05	1:37½	2:14½

2:12 Trot. \$500—Divided \$250, \$125, \$75, \$50.

Baron Rogers, br. c	1	6	1
Senator A., g. h	2	1	3
Fred B., br. g	4	2	2
Emma Offit, br. m	3	4	5
Orino, b. m	5	5	7
Barrimore, br. h	6	7	6
McW, b. h	8	8	Dr.

TIME.

	$\frac{1}{4}$ Mile.	$\frac{1}{2}$ Mile.	$\frac{3}{4}$ Mile.	Mile.
First heat	:32	1:04	1:33 $\frac{1}{2}$	2:11 $\frac{1}{2}$
Second heat	:32 $\frac{3}{4}$	1:05 $\frac{1}{2}$	1:38 $\frac{1}{2}$	2:13 $\frac{1}{2}$
Third heat	:33 $\frac{1}{4}$	1:06	1:37 $\frac{1}{2}$	2:10 $\frac{1}{2}$

WEDNESDAY, SEPTEMBER 16.

2:30 Pace. \$500 divided—\$250, \$125, \$75, \$50.

Wilhelmina, b. m.	1	1
Mark Reed, g. g.	2	3
Hal Rowe, c. g.	10	2
Tom Cole, b. h.	3	9
Shouldn't Wonder, b. g	4	4
Arline, b. m	5	7
Speed Wilkes, b. h.	7	5
Noble Harry, br. g	9	6
Ixwood, b. h.	8	8
Exa, b. m	6	Dis.
Dr. Riley, br. h.	Dis.	
Bay Hal, b. g	Dis.	

TIME.

	$\frac{1}{4}$ Mile.	$\frac{1}{2}$ Mile.	$\frac{3}{4}$ Mile.	Mile
First heat.	:34 $\frac{3}{4}$	1:08 $\frac{1}{2}$	1:42 $\frac{1}{2}$	2:16 $\frac{1}{2}$
Second heat	:33 $\frac{1}{4}$	1:07 $\frac{1}{2}$	1:43	2:19 $\frac{1}{4}$

2:20 Trot. \$500 divided—\$250, \$125, \$75, \$50.

Willow, b. m.	1	1
Victor Spague, c. g.	2	2
Dora H.	3	4
Turquoise, b. m.	13	3
Exploit, g. h.	4	8
Jalisco, br. h.	5	12
Bradford, b. h.	14	5
Kitchel's Red Wilkes, b. h.	7	6
Grace O'Malley, c. m.	6	11
Grandley, b. h.	8	7

Ilma Cossack, br. m.	10	9
Hazette, b. m.	9	13
Superior Wilkes	11	10
Interval	12	14
J. Z, g. g.	15	15
Greenfield Boy	Dis.	

	TIME.	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat		:35½	1:10	1:44½	2:18½
Second heat.		34½	1:08½	1:43	2:16½

Free for-all Pace. \$500 divided—\$250, \$125, \$75, \$50.

Lotta Loraine, b. m.	1	1
Old Hutch, br. g.	2	3
Pearl C, br. m.	4	2
Ella T, g. m.	3	4
Billy Walters, b. h.	5	5

	TIME.	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat		:32	1:03½	1:35	2:09
Second heat		:32	1:02½	1:35	2:09½

2:20 Pace. \$500 divided—\$250, \$125, \$75, \$50.

One One, b. m	1	1
Lady Anderson, r. m	3	2
Josephine, b. m	2	3
Kitty Van.	4	11
Prestora Wilkes	11	4
Ichonadart, b. g	16	5
Sport, s. h	7	6
J. Girl, g. m.	10	7
Lady Golden, c. m	14	8
Charlie G., bl. g	5	dr.
Replica, c. m.	6	dr.
Nellie S.	8	dr.
Gamrose, b. h	9	dr.
Humming Bird, b. m.	12	dr.
Dominator, br. m	13	dr.
The Jarvis, b. m	15	dr.
Florence F., s. m.	17	dr.

	TIME.	¼ Mile.	½ Mile.	¾ Mile.	Mile.
First heat		:32½	1:06	1:40½	2:14½
Second heat		:33	1:05	1:37½	2:11½

DEPARTMENT B.

HEAVY DRAFT AND COACH HORSES.

JAMES M. SANKEY, Superintendent.

To the Indiana Delegate State Board of Agriculture:

MR. PRESIDENT AND GENTLEMEN—In submitting my report as Superintendent of Heavy Draft and Coach Horses, I desire to state that, while the exhibit was not greatly increased in numbers, it was in quality of the animals shown. The depression of the market for horses of all kinds lends little encouragement to breeders, hence the lack of effort to come before the public with an extensive exhibit.

I have no recommendations as to changes needed, believing that the Board should continue to encourage breeds until they shall demonstrate that they compared with other breeds are unworthy. The number of entries was as follows:

French Draft and Percherons	8
Clydesdale and English Shires	8
French and German Coach	10
Cleveland Bay and American Coach	36
Total	62

The expense of the department for Judge and assistant was \$37.80.

AWARDS.

CLASS I—French Draft and Percherons.

STALLIONS.

4 years old and over, Burgess Bros., Wenona, Ill	\$20 00
From 3 to 4 years old, Q. K. Bankert, Morristown, Ind	15 00
From 2 to 3 years old, Burgess Bros., Wenona, Ill	12 00
Colt, Burgess Bros., Wenona, Ill	8 00

MARES.

4 years old and over, Burgess Bros., Wenona, Ill	20 00
From 2 to 3 years old, Burgess Bros., Wenona, Ill	12 00
From 1 to 2 years old, Burgess Bros., Wenona, Ill	10 00
Stallion and four colts, Burgess Bros., Wenona, Ill	20 00

H. C. Hanna, Terre Haute, Ind., Judge.

CLASS II—Clydesdale and English Shires.

STALLIONS

4 years old and over, Thos. Bennett, Rossville, Ill	\$20 00
Second, Dr. Bradfute & Son, Cedarville, O	15 00
Third, Burgess Bros., Wenona, Ill	10 00
3 to 4 years old, Burgess Bros., Wenona, Ill	15 00
2 to 3 years old, Burgess Bros., Wenona, Ill	12 00
Second, Burgess Bros., Wenona, Ill	9 00
1 to 2 years old, Burgess Bros., Wenona, Ill	10 00
Second, Burgess Bros., Wenona, Ill	7 00
Colt, Burgess Bros., Wenona, Ill	8 00

MARES.

4 years old or over, Burgess Bros., Wenona, Ill	20 00
Second, Burgess Bros., Wenona, Ill	15 00
3 to 4 years old, Burgess Bros., Wenona, Ill	15 00
Second, Burgess Bros., Wenona, Ill	12 00
2 to 3 years old, Burgess Bros., Wenona, Ill	12 00
1 to 2 years old, Burgess Bros., Wenona, Ill	10 00
Second, Burgess Bros., Wenona, Ill	7 00
Colt, Burgess Bros., Wenona, Ill	8 00
Stallion and four colts, Roachdale & Ladoga Co., Ladoga, Ind	20 00
Second, Burgess Bros., Wenona, Ill	15 00

H. C. Hanna, Terre Haute, Ind., Judge.

CLASS III—French and German Coach.

STALLIONS.

4 years old or over, Wm. A. Perry, Deming, Ind	20 00
Second, Lou Young, Crawfordsville, Ind	15 00
Third, O. Hobbell, 231 North Mississippi Street, city	10 00
3 to 4 years old, Wm. A. Perry, Deming, Ind	20 00
1 to 2 years old, Burgess Bros., Wenona, Ill.	10 00
Colt, Wm. A. Perry, Deming, Ind	8 00
Second, Wm. A. Perry, Deming, Ind	6 00

MARES.

Colt, Wm. A. Perry, Deming, Ind	8 00
Second, Wm. A. Perry, Deming, Ind	6 00
Stallion and four colts, Lou Young, Crawfordsville, Ind.	20 00
Second, Wm. A. Perry, Deming, Ind	15 00

H. C. Hanna, Terre Haute, Ind., Judge.

CLASS IV—Cleveland Bay, Hackney and American Coach.

4 years old and over, Thomas & Bland, Newmarket, Ind	\$20 00
Second, Burgess Bros., Wenona, Ill.	12 00
Third, Thomas & Bland, Newmarket, Ind	10 00
3 to 4 years old, Thomas & Bland, Newmarket, Ind	15 00
Second, J. R. Peck & Son, Winchester, Ill	12 00
2 to 3 years old, Burgess Bros., Wenona, Ill.	12 00
Second, J. R. Peck & Son, Winchester, Ill	9 00
1 to 2 years old, Burgess Bros., Wenona, Ill.	10 00
Second, Burgess Bros., Wenona, Ill.	7 00
Third, J. R. Peck & Son, Winchester, Ill	5 00
Colt, Burgess Bros., Wenona, Ill	8 00

MARES.

4 years old or over, Burgess Bros., Wenona, Ill	20 00
Second, Burgess Bros., Wenona, Ill.	15 00
Third, Thomas & Bland, Newmarket, Ind.	10 00
3 to 4 years old, Thomas & Bland, Newmarket, Ind	15 00
2 to 3 years old, Burgess Bros., Wenona, Ill.	12 00
1 to 2 years old, J. R. Peck & Son, Winchester, Ill.	10 00
Colt, J. R. Peck & Son, Winchester, Ill	8 00
Stallion and four colts, Burgess Bros., Wenona, Ill	20 00

H. C. Hanna, Terre Haute, Ind., Judge.

DEPARTMENT C.

REPORT OF LIGHT HARNESS HORSES, COACH AND CARRIAGE TEAMS, PONIES AND EQUIPAGES.

W. M. BLACKSTOCK, Superintendent.

To the President and Delegate Board of Agriculture of the State of Indiana :

Your Superintendent of Classes 5, 6, 7 and 8 begs leave to report for the year 1896 that, notwithstanding the general depression of horse markets throughout the United States, the Horse Fair of 1896, in the driving classes, was the best ever held upon those grounds. The classes were well filled and the quality of the horses and turnouts was excellent.

	<i>Entries Made.</i>
Light Harness Class	103
Road, Coach and Carriage Teams, etc	64
Pony Class	9
Equipage Class	32
Total entries	208

The show of Double and Single Roadsters was unusually fine as was also the Equipage Class. Taken altogether, the exhibits in this department were almost double in number over that of any former Fair for several years past. In the future this department should be made an attractive feature of the exhibition for the reason that while common, ill-bred horses are cheap and unsalable, on the contrary, high class driving horses are high-priced, in great demand and difficult to obtain not alone in this country, but also in Europe. During the last year large numbers of good road horses were shipped from this State to England and Germany. In the Roadster Class there is a promising outlook for the breeder and trainer.

The expenses of this department for assistants, judges, etc., were \$76.10

AWARDS.

CLASS V—*Light Harness Horses.*

STALLIONS.

4 years old or over, A. C. Turner, Ross, Ohio	\$20 00
Second, O. Hobbell, 231 N. Mississippi Street, Indianapolis.	15 00
Third, J. R. Peck & Son, Winchester, Ill	10 00
3 to 4 years old, M. L. Hare, 500 N. Pennsylvania Street, Indianapolis .	15 00
Second, Pat Dickerson, Indianapolis	12 00
Third, A. C. Turner, Ross, Ohio	9 00
2 to 3 years old, A. C. Turner, Ross, Ohio.	12 00
Second, George J. Fuller	9 00
Third, Jesse Fletcher, 252 Clifford Avenue, Indianapolis	6 00
1 to 2 years old, Ora S. Doggett, Downeyville, Ind	10 00
Second, J. W. Gurley, Martinsville, Ind	7 00
Third, John Haneman, 186 Hillside Avenue, Indianapolis.	5 00
Colt, M. L. Hare, 500 N. Pennsylvania Street, Indianapolis	8 00

MARES.

4 years old or over, N. F. Kirby, 1205 W. College Avenue, Jacksonville, Ill.	\$20 00
Second, Ora S. Doggett, Downeyville, Ind	15 00
Third, E. White, Elwood, Ind.	10 00
3 to 4 years old, N. F. Kirby, 1205 W. College Avenue, Jacksonville, Ill.	15 00
Second, A. C. Turner, Ross, Ohio	12 00
Third, A. C. Turner, Ross, Ohio	8 00
2 to 3 years old, A. C. Turner, Ross, Ohio.	12 00
Second, Jesse Fletcher, 252 Clifford Avenue, Indianapolis	9 00
Third, A. C. Turner, Ross, Ohio	6 00
1 to 2 years old, M. L. Hare, 500 N. Pennsylvania Street, Indianapolis. .	10 00
Colts, J. R. Peck & Son, Winchester, Ill	8 00
Second, James Smith, Oak Hill P. O., Ind	6 00
Third, M. L. Hare, 500 N. Pennsylvania Street, Indianapolis.	4 00

GELDINGS.

4 years old or over, C. H. Anthony, Muncie, Ind	\$20 00
Second, J. R. Peck & Son, Winchester, Ill	15 00
Third, A. C. Turner, Ross, Ohio	10 00
3 to 4 years old, A. C. Turner, Ross, Ohio	15 00
Second, C. H. Anthony, Muncie, Ind	12 00
Third, Jesse Fletcher, 252 Clifford Avenue, Indianapolis	8 00
2 to 3 years old, second award, J. W. Robey, Sabine, Ind	9 00
Stallion and four colts, A. C. Turner, Ross, Ohio	20 00
Second, J. R. Peck & Son, Winchester, Ill	15 00
Third, M. L. Hare, 500 N. Pennsylvania Street, Indianapolis	10 00

W. W. Danforth, Eaton, Ohio, Judge.

CLASS VI—Coach and Carriage Teams, Roadsters and Saddlers.

Coach or carriage teams, Horace F. Wood, 25 Monument Place, Indianapolis.	\$30 00
Second, Thomas & Bland, Newmarket, Ind	20 00
Third, George L. Bradbury, 114 N. Meridian Street, Indianapolis.	15 00
Single roadster (mare), Geo. W. Kochne, Normandie Hotel, Indianapolis.	30 00
Second, N. T. Kirbey, 1205 W. College Avenue, Jacksonville, Ill	20 00
Third, A. C. Turner, Ross, Ohio	15 00
Single roadster, gelding, A. C. Turner, Ross, Ohio	30 00
Second, S. C. Curtis, Lafayette, Ind	20 00
Third, Blare & Baker, Union Stock Yards, Indianapolis	15 00
Double roadsters, S. C. Curtis, Lafayette, Ind	30 00
Second, J. R. Peck & Son, Winchester, Ill	20 00
Third, N. T. Kirbey, 1205 W. College Avenue, Jacksonville, Ill	15 00
Saddle stallion, John Connely, Madison, Ind	30 00
Second, Wymond J. Beckett, 726 Ash Street, Indianapolis	20 00
Saddle mare, R. W. Mitchell, Locust, Ky	30 00
Saddle gelding, John Connely, Madison, Ind	30 00
Second, J. R. Peck & Son, Winchester, Ill	20 00
Third, Horace F. Wood, 25 Monument Place, Indianapolis	15 00

W. W. Danforth, Eaton, Ohio, Judge.

CLASS VII—Ponies, All Breeds.

Pony, eleven hands high or under, S. Johnson, 718 N. Meridian Street, Indianapolis	\$10 00
Second, Grace Christian, 206 N. Alabama Street, Indianapolis	7 00
Third, Mildred Meeker, 1060 E. Michigan Street, Indianapolis	5 00
Pony, eleven to thirteen hands, W. J. Gilray, 55 Woodland Avenue, Indianapolis	10 00

Second, Rudolph Leeds, 66 N. Meridian Street, Indianapolis	\$7 00
Pony, thirteen to fourteen and one-half hands, Blair & Baker, Union Stock Yards, Indianapolis	10 00
W. W. Danforth, Eaton, Ohio, Judge.	

CLASS VIII—Equipages.

Two-horse, two-seated equipage, Geo. L. Bradbury, Denison House, In- dianapolis	\$20 00
Second, Horace F. Wood, 25 Monument Place, Indianapolis	15 00
Third, Horace F. Wood, 25 Monument Place, Indianapolis	10 00
One-horse, one seated equipage, Mrs. J. B. Newman, Indianapolis	15 00
Second, Horace F. Wood, 25 Monument Place, Indianapolis	12 00
Third, Mildred Meeker, 106 1/2 E. Michigan Street, Indianapolis	7 00
One-horse, one-seated equipage, lady, Pine Devay, Meridian stables, In- dianapolis	15 00
Second, Horace F. Wood, 25 Monument Place, Indianapolis	12 00
Third, Horace F. Wood, 25 Monument Place, Indianapolis	7 00
Dog-cart, fifteen and one-half hands, gent, Thomas & Bland, Newmarket, Ind.	15 00

W. W. Danforth, Eaton, Ohio, Judge.

DEPARTMENT D.

CATTLE—BEEF BREEDS.

J. W. LAGRANGE, Superintendent.

To the President and Delegate State Board of Agriculture :

As Superintendent of the Beef Cattle I can report one of the best shows ever made in Indiana. All the breeds were well represented, some of the breeds being the best since the World's Fair. There were 354 entries, and the work was carried through with unusual good feeling, all the exhibitors being well pleased with our Fair and their treatment.

LIST OF ENTRIES.

Class 9, Shorthorns	66
Class 10, Herefords	78
Class 11, Polled Angus	64
Class 12, Galloways	54
Class 13, All Red Poll	18
Class 14, Devons	44

Total 324
The expense of the department for judges and assistants was \$73.90.

AWARDS.

CLASS IX—*Shorthorns.*

BULLS.

3 years old or over, J. C. Robbins & Sons, Horace, Me	\$15 00
Second, Aaron Barber, Aaron, N. Y	10 00
Third, H. F. Brown, Minneapolis, Minn	5 00
2 to 3 years old, J. C. Robbins & Sons, Horace, Me	10 00
1 to 2 years old, Aaron Barber, Aaron, N. Y	8 00
Second, J. C. Robbins & Sons, Horace, Me	6 00
Third, W. F. Miller & Son, Carlos, Ind.	3 00
Calf under 1 year old, H. F. Brown, Minneapolis, Minn	5 00
Second, W. F. Miller & Son, Carlos, Ind	3 00

COWS AND HEIFERS.

3 years old or over, Aaron Barber, Aaron, N. Y	15 00
Second, H. F. Brown, Minneapolis, Minn.	10 00
Third, J. C. Robbins & Sons, Horace, Me.	5 00
2 to 3 years old, J. C. Robbins & Sons, Horace, Me	10 00
Second, H. F. Brown, Minneapolis, Minn.	7 00
Third, Aaron Barber, Aaron, N. Y	4 00
1 to 2 years old, J. C. Robbins & Sons, Horace, Me.	8 00
Second, H. F. Brown, Minneapolis, Minn.	3 00
Calf under 1 year, Aaron Barber, Aaron, N. Y	5 00
Second, J. C. Robbins & Sons, Horace, Me	3 00
Third, H. F. Brown, Minneapolis, Minn	2 00
Four animals, get of one sire, H. F. Brown, Minneapolis, Minn	10 00
Second, Aaron Barber, Aaron, N. Y	7 00
Third, J. C. Robbins & Sons, Horace, Me.	4 00
Two animals, produce of one cow, Aaron Barber, Aaron, N. Y	10 00
Second, H. F. Brown, Minneapolis, Minn.	7 00
Third, H. F. Brown, Minneapolis, Minn	4 00
Exhibitor's herd, J. C. Robbins & Sons, Horace, Me	20 00
Second, Aaron Barber, Aaron, N. Y	10 00
Breeder's herd, Aaron Barber, Aaron, N. Y	20 00
Second, H. F. Brown, Minneapolis, Minn.	10 00
Best bull, sweepstakes, J. C. Robbins & Sons, Horace, Me.	20 00
Best cow or heifer, Aaron Barber, Aaron, N. Y	20 00

E. B. Mitchell, Richard Gibson, Judges.

CLASS X—Herefords.

BULLS.

3 years old or over, Thos. Clark, Beecher, Ill	\$15 00
Second, W. S. Vannatta, Fowler, Ind	10 00
Third, G. W. Harness, Galveston, Ind	5 00
2 to 3 years old, W. S. Vannatta, Fowler, Ind	10 00
Second, G. W. Harness, Galveston, Ind.	7 00
Third, H. F. Schuelker, New Haven, Ind.	4 00
1 to 2 years old, Thos. Clark, Beecher, Ill.	8 00
Second, G. W. Harness, Galveston, Ind.	6 00
Third, H. F. Schuelker, New Haven, Ind.	3 00
Calf, W. S. Vannatta, Fowler, Ind.	5 00
Second, Thos. Clark, Beecher, Ill	3 00
Third, W. S. Vannatta, Fowler, Ind	2 00

COWS AND HEIFERS.

3 years old or over	
2 to 3 years old, Thos. Clark, Beecher, Ill	\$10 00
Second, W. S. Vannatta, Fowler, Ind	7 00
Third, Thos. Clark, Beecher, Ill	4 00
1 to 2 years old, Thos. Clark, Beecher, Ill	8 00
Second, Thos. Clark, Beecher, Ill	6 00
Third, W. S. Vannatta, Fowler, Ind	3 00
Calf, W. S. Vannatta, Fowler, Ind	5 00
Second, Thos. Clark, Beecher, Ill	3 00
Third, W. S. Vannatta, Fowler, Ind	2 00
Four animals, get of one sire, Thos. Clark, Beecher, Ill	10 00
Second, W. S. Vannatta, Fowler, Ind	7 00
Third, G. W. Harness, Galveston, Ind	4 00
Two animals, produce of one cow, Thos. Clark, Beecher, Ill	10 00
Second, Thos. Clark, Beecher, Ill	7 00
Third, W. S. Vannatta, Fowler, Ind	4 00
Exhibitor's herd, Thos. Clark, Beecher, Ill	20 00
Second, W. S. Vannatta, Fowler, Ind	10 00
Breeder's herd, Thos. Clark, Beecher, Ill	20 00
Second, W. S. Vannatta, Fowler, Ind	10 00
Best bull, Thos. Clark, Beecher, Ill	20 00
Best cow or heifer, Thos. Clark, Beecher, Ill	20 00

David McKay, Judge.

CLASS XI.—Polled Angus.

BULLS.

3 years old or over, Goodwin & Judy, West Lebanon, Ind	\$15 00
Second, Dr. Bradfute & Son, Cedarville, O	10 00

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Third, Dr. Bradfute & Son, Cedarville, O	\$5 00
2 to 3 years old, Dr. Bradfute & Son, Cedarville, O	10 00
1 to 2 years old, Goodwin & Judy, West Lebanon, Ind	8 00
Second, Dr. Bradfute & Son, Cedarville, O	6 00
Calf, Dr. Bradfute & Son, Cedarville, O	5 00
Second, Dr. Bradfute & Son, Cedarville, O	3 00
Third, Goodwin & Judy, West Lebanon, Ind	2 00

COWS AND HEIFERS.

3 years old or over, Dr. Bradfute & Son, Cedarville, O	\$15 00
Second, Dr. Bradfute & Son, Cedarville, O	10 00
Third, Goodwin & Judy, West Lebanon, Ind	5 00
2 to 3 years old, Dr. Bradfute & Son, Cedarville, O	10 00
Second, Goodwin & Judy, West Lebanon, Ind	7 00
Third, Dr. Bradfute & Son, Cedarville, O	4 00
1 to 2 years old, Goodwin & Judy, West Lebanon, Ind	8 00
Second, Dr. Bradfute & Son, Cedarville, O	6 00
Third, Goodwin & Judy, West Lebanon, Ind	3 00
Calf, F. A. Branch, Medina, O	5 00
Second, Dr. Bradfute & Son, Cedarville, O	3 00
Third, Goodwin & Judy, West Lebanon, Ind	2 00
Four animals, get of one sire, Dr. Bradfute & Son, Cedarville, O	10 00
Second, Dr. Bradfute & Son, Cedarville, O	7 00
Third, Dr. Bradfute & Son, Cedarville, O	4 00
Two animals, produce of one cow, Dr. Bradfute & Son, Cedarville, O	10 00
Second, Goodwin & Judy, West Lebanon, Ind.	7 00
Third, Goodwin & Judy, West Lebanon, Ind	4 00
Exhibitor's herd, Goodwin & Judy, West Lebanon, Ind.	20 00
Second, Dr. Bradfute & Son, Cedarville, O.	10 00
Breeder's herd, Dr. Bradfute & Son, Cedarville, O	20 00
Second, Goodwin & Judy, West Lebanon, Ind.	10 00
Best bull, Goodwin & Judy, West Lebanon, Ind.	20 00
Best cow or heifer, Dr. Bradfute & Son, Cedarville, O	20 00

W. S. Vannatta, Judge.

CLASS XII—Galloways.

BULLS.

3 years old or over, Chapman Bros, South Rockwood, Ill.	\$15 00
Second, G. W. Gillman, Winchester, Ind.	10 00
2 to 3 years old, G. W. Gillman, Winchester, Ind.	10 00
1 to 2 years old, Chapman Bros., South Rockwood, Ill	8 00
Second, G. W. Gillman, Winchester, Ind.	6 00
Calf, Chapman Bros., South Rockwood, Ill	5 00
Second, G. W. Gillman, Winchester, Ind	3 00
Third, G. W. Gillman, Winchester, Ind.	2 00

COWS AND HEIFERS.

3 years old or over, Chapman Bros., South Rockwood, Ill.	\$15 00
Second, G. W. Gillman, Winchester, Ind	10 00
Third, G. W. Gillman, Winchester, Ind.	5 00
2 to 3 years old, Chapman Bros., South Rockwood, Ill	10 00
Second, G. W. Gillman, Winchester, Ind.	7 00
Third, G. W. Gilman, Winchester	4 00
1 to 2 years old, Chapman Bros. South Rockwood, Ill	8 00
Second, Chapman Bros., South Rockwood, Ill.	6 00
Third, Chapman Bros., South Rockwood, Ill.	3 00
Calf, Chapman Bros., South Rockwood, Ill	5 00
Second, Chapman Bros., South Rockwood, Ill	3 00
Third, G. W. Gillman, Winchester, Ind.	2 00
Four animals, get of one sire, Chapman Bros., South Rockwood, Ill . . .	10 00
Second, G. W. Gillman, Winchester, Ind	7 00
Two animals, produce of one cow, Chapman Bros., South Rockwood, Ill .	10 00
Second, Chapman Bros., South Rockwood, Ill	7 00
Exhibitor's herd, Chapman Bros., South Rockwood, Ill.	20 00
Second, G. W. Gillman, Winchester, Ind	10 00
Breeder's herd, Chapman Bros., South Rockwood, Ill.	20 00
Second, G. W. Gillman, Winchester, Ind.	10 00
Best bull, Chapman Bros., South Rockwood, Ill.	20 00
Best cow or heifer, Chapman Bros., South Rockwood, Ill	20 00

W. S. Vannatta, Judge.

CLASS XIII—All Red Polls.

BULLS.

3 years old or more, J. H. Miller, Mexico, Ind.	\$15 00
2 to 3 years old, J. H. Miller, Mexico, Ind.	10 00
1 to 2 years old, J. H. Miller, Mexico, Ind	8 00
Calf, J. H. Miller, Mexico, Ind	5 00

COWS AND HEIFERS.

3 years old or over, J. H. Miller, Mexico, Ind	15 00
2 to 3 years old, J. H. Miller, Mexico, Ind	10 00
1 to 2 years old, J. H. Miller, Mexico, Ind	8 00
Calf, J. H. Miller, Mexico, Ind	5 00
Four animals, gelding of one sire, J. H. Miller, Mexico, Ind	10 00
Two animals, produce of one cow, J. H. Miller, Mexico, Ind	10 00
Exhibitor's herd, J. H. Miller, Mexico, Ind	20 00
Breeder's herd, J. H. Miller, Mexico, Ind	20 00
Best bull, J. H. Miller, Mexico, Ind	20 00
Best cow or heifer, J. H. Miller, Mexico, Ind	20 00

E. B. Mitchell, Judge.

CLASS XIV—Devons.

BULLS.

3 years old or over, W. R. Lewis, Grand Rapids, Mich	\$15 00
Second, D. V. Whitmore, Casstown, O	10 00
2 to 3 years old, D. V. Whitmore, Casstown, O	10 00
Second, W. E. Lewis, Grand Rapids, Mich	7 00
1 to 2 years old, W. E. Lewis, Grand Rapids, Mich	8 00
Second, D. V. Whitmore, Casstown, O	6 00
Calf, D. V. Whitmore, Casstown, O	5 00
Second, W. E. Lewis, Grand Rapids, Mich	3 00
Third, W. E. Lewis, Grand Rapids, Mich	2 00

COWS AND HEIFERS.

3 years old or more, D. V. Whitmore, Casstown, O	15 00
Second, D. V. Whitmore, Casstown, O	10 00
Third, W. E. Lewis, Grand Rapids, Mich	5 00
1 to 2 years old, D. V. Whitmore, Casstown, O	8 00
Second, W. E. Lewis, Grand Rapids, Mich	6 00
Third, D. V. Whitmore, Casstown, O	3 00
Calf, W. E. Lewis, Grand Rapids, Mich	5 00
Second, D. V. Whitmore, Casstown, O	3 00
Third, W. E. Lewis, Grand Rapids, Mich	2 00
Four animals, get of one sire, D. V. Whitmore, Casstown, O	10 00
Second, W. E. Lewis, Grand Rapids, Mich	7 00
Third, W. E. Lewis, Grand Rapids, Mich	4 00
Two animals, produce of cow, D. V. Whitmore, Casstown, O	10 00
Second, W. E. Lewis, Grand Rapids, Mich	7 00
Third, W. E. Lewis, Grand Rapids, Mich	4 00
Exhibitor's herd, D. V. Whitmore, Casstown, O	20 00
Second, W. E. Lewis, Grand Rapids, Mich	10 00
Breeder's herd, D. V. Whitmore, Casstown, O	20 00
Second, W. E. Lewis, Grand Rapids, Mich	10 00
Best bull, W. E. Lewis, Grand Rapids, Mich	20 00
Best cow or heifer, W. E. Lewis, Grand Rapids, Mich	20 00

W. S. Vannatta, Judge.

COWS AND HEIFERS.

3 years old or over, Thos. Clark, Beecher, Ill	\$15 00
Second, W. S. Vannatta, Fowler, Ind	10 00
Third, G. W. Harness, Galveston, Ill	5 00
2 to 3 years old, W. S., Galveston, Ill	10 00
Second, G. W. Harness, Galveston, Ill	7 00
Third, H. F. Schulker, New Haven, Ind	4 00
1 to 2 years old, Thos. Clark, Beecher, Ill	8 00
Second, G. W. Harness, Galveston, Ill	6 00
Third, H. F. Schulker, New Haven, Ind	3 00

DEPARTMENT E.
CATTLE—DAIRY BREEDS.

C. B. HARRIS, Superintendent.

To the Indiana Delegate State Board of Agriculture :

MR. PRESIDENT AND GENTLEMEN—In this department there were 264 entries, divided as follows :

Holstein-Freisans	87
Ayrshires	64
Jerseys	84
Guernseys	49
Total	264

The expense of operating this department was \$45.65.

AWARDS.

CLASS XV—Holstein-Freisans.

BULLS.

3 years old or over, W. H. Lagrange & Son, Franklin, Ind	\$15 00
Second, Harvey S. Day, Willis, Mich.	10 00
Third, Wesley Pindham, Agt., Chillicothe, O	5 00
2 to 3 years old, W. H. Lagrange & Son, Franklin, Ind	10 00
Second, Wesley Pindham, Agt., Chillicothe, O	7 00
Third, Wesley Pindham, Agt., Chillicothe, O	4 00
1 to 2 years old, W. H. Lagrange & Son, Franklin, Ind	8 00
Second, Wesley Pindham, Agt., Chillicothe, O	6 00
Third, Harvey S. Day, Willis, Mich	3 00
Calf, Harvey S. Day, Willis, Mich.	5 00
Second, W. H. Lagrange & Son, Franklin, Ind	3 00
Third, Wesley Pindham, Agt., Chillicothe, O	2 00

COWS AND HEIFERS.

3 years old or over, Harvey S. Day, Willis, Mich	15 00
Second, W. H. Lagrange & Son, Franklin, Ind	10 00
Third, Harvey S. Day, Willis, Mich	5 00
2 to 3 years old, W. H. Lagrange & Son, Franklin, Ind.	10 00
Second, Wesley Pindham, Agt., Chillicothe, O	7 00
Third, W. H. Lagrange & Son, Franklin, Ind	4 00
1 to 2 years old, W. H. Lagrange & Son, Franklin, Ind	8 00

Second, Harvey S. Day, Willis, Mich.	\$6 00
Third, Harvey S. Day, Willis, Mich.	3 00
Calf, Wesley Pindham, Agt., Chillicothe, O.	5 00
Second, Harvey S. Day, Willis, Mich.	3 00
Third, W. H. Lagrange & Son, Franklin, Ind.	2 00
Four animals, get of one sire, W. H. Lagrange & Son, Franklin, Ind. . .	10 00
Second, Harvey S. Day, Willis, Mich.	7 00
Third, W. H. Lagrange & Son, Franklin, Ind.	4 00
Two animals, produce of one cow, W. H. Lagrange & Son, Franklin, Ind.	10 00
Second, Wesley Pindham, Agt., Chillicothe, O.	7 00
Third, W. H. Lagrange & Son, Franklin, Ind.	4 00
Exhibitor's herd, W. H. Lagrange & Son, Franklin, Ind.	20 00
Second, Harvey S. Day, Willis, Mich.	10 00
Breeder's herd, W. H. Lagrange & Son, Franklin, Ind.	20 00
Second, Wesley Pindham, Agt., Chillicothe, O.	10 00
Best bull, W. H. Lagrange & Son, Franklin, Ind.	20 00
Best cow or heifer, Harvey S. Day, Willis, Mich.	20 00
M. S. Scovell, Lexington, Ky., Judge.	

CLASS XVI—Ayrshires.

BULLS.

3 years old or over, J. F. Converse & Co., Syracuse, N. Y.	15 00
Second, McCormick & Edgerly, Pataskala, O.	10 00
Third, W. J. Munce, Clokey, Penn.	5 00
2 to 3 years old, McCormick & Edgerly, Pataskala, O.	10 00
Second, J. F. Converse & Co., Syracuse, N. Y.	7 00
Third, W. J. Munce, Clokey, Penn.	4 00
1 to 2 years old, J. F. Converse & Co., Syracuse, N. Y.	8 00
Second, McCormick & Edgerly, Pataskala, O.	6 00
Third, W. J. Munce, Clokey, Penn.	3 00
Calf, J. F. Converse & Co., Syracuse, N. Y.	5 00
Second, McCormick & Edgerly, Pataskala, O.	3 00
Third, W. J. Munce, Clokey, Penn.	2 00

COWS AND HEIFERS.

3 years old or over, W. S. Munce, Clokey, Penn.	15 00
Second, McCormick & Edgerly, Pataskala, O.	10 00
Third, F. J. Converse, Syracuse, N. Y.	5 00
2 to 3 years old, McCormick & Edgerly, Pataskala, O.	10 00
Second, W. J. Munce, Clokey, Penn.	7 00
Third, McCormick & Edgerly, Pataskala, O.	4 00
1 to 2 years old, McCormick & Edgerly, Pataskala, O.	8 00
Second, W. J. Munce, Clokey, Penn.	6 00
Third, McCormick & Edgerly, Pataskala, O.	3 00
Calf, McCormick & Edgerly, Pataskala, O.	5 00

Second, J. F. Converse & Co., Syracuse, N. Y	\$3 00
Third, W. J. Munce, Clokey, Penn	2 00
Four animals, get of one sire, McCormick & Edgerly, Pataskala, O . . .	10 00
Second, J. W. Converse & Co., Syracuse, N. Y	7 00
Third, W. J. Munce, Clokey, Penn	4 00
Two animals, produce of one cow, McCormick & Edgerly, Pataskala, O . .	10 00
Second, W. J. Munce, Clokey, Penn	7 00
Third, McCormick & Edgerly, Pataskala, O	4 00
Exhibitor's herd, McCormick & Edgerly, Pataskala, O	20 00
Second, W. J. Munce, Clokey, Penn	10 00
Breeder's herd, McCormick & Edgerly, Pataskala, O	20 00
Second, J. W. Converse, Syracuse, N. Y	10 00
Best bull, J. W. Converse, Syracuse, N. Y	20 00
Best cow or heifer, W. J. Munce, Clokey, Penn	20 00

W. S. Scovell, Lexington, Ky., Judge.

CLASS XVII—Jerseys.

BULLS.

3 years old or over, Miller & Sibley, Franklin, Penn	\$15 00
Second, Thos. Levi, Noblesville, Ind	10 00
Third, Miller & Sibley, Franklin, Penn	5 00
2 to 3 years old, Miller & Sibley, Franklin, Penn	10 00
1 to 2 years old, Miller & Sibley, Franklin, Penn	8 00
Second, M. L. Hessong, Alliance, Ind	6 00
Third, Thos. Levi, Noblesville, Ind	3 00
Calf, Miller & Sibley, Franklin, Penn	5 00
Second, Thos. Levi, Noblesville, Ind	3 00
Third Miller & Sibley, Franklin, Penn	2 00

COWS AND HEIFERS.

3 years old or over, Miller & Sibley, Franklin, Penn	\$15 00
Second, Miller & Sibley, Franklin, Penn	10 00
Third, Thos. Levi, Noblesville, Ind	5 00
2 to 3 years old, Miller & Sibley, Franklin, Penn	10 00
Second, Miller & Sibley, Franklin, Penn	7 00
Third, Thos. Levi, Noblesville, Ind	4 00
1 to 2 years old, Miller & Sibley, Franklin, Penn	8 00
Second, Thomas Levi, Noblesville, Ind	6 00
Third, Thomas Levi, Noblesville, Ind	3 00
Calf, Miller & Sibley, Franklin, Penn	5 00
Second, Peter Raab, Brightwood, Ind	3 00
Third, Miller & Sibley, Franklin, Penn	2 00
Four animals, get of one sire, Miller & Sibley, Franklin, Penn . . .	10 00
Second, Thomas Levi, Noblesville, Ind	7 00
Third, M. L. Hessong, Alliance, Ind	4 00
Two animals, produce of one cow, Miller & Sibley, Franklin, Penn . . .	10 00

Second, Thomas Levi, Noblesville, Ind	\$7 00
Third, Thomas Levi, Noblesville, Ind	4 00
Exhibitors' herd, Miller & Sibley, Franklin, Penn	20 00
Second, Miller & Sibley, Franklin, Penn	10 00
Breeders' herd, Miller & Sibley, Franklin, Penn	20 00
Second, Thomas Levi, Noblesville, Ind	10 00
Best bull, Miller & Sibley, Franklin, Penn	20 00
Best cow or heifer, Miller & Sibley, Franklin, Penn	20 00

Mortimer Levering, Lafayette, Ind., Judge.

CLASS XVIII—Guernseys.

BULLS.

3 years old or over, Joe Defrees, Piqua, Ohio	\$15 00
2 to 3 years old, W. D. Richardson, Garden City, Minn	10 00
Second, McCormick & Edgerly, Pataskala, Ohio.	7 00
1 to 2 years old, W. D. Richardson, Garden City, Minn	8 00
Second, John Morgan, Plainfield, Ind	6 00
Calf, W. D. Richardson, Garden City, Minn	5 00
Second, McCormick & Edgerly, Pataskala, Ohio.	3 00
Third, W. D. Richardson, Garden City, Minn	2 00

COWS AND HEIFERS.

3 years old or over, Joe Defrees, Piqua, Ohio	\$15 00
Second, McCormick & Edgerly, Pataskala, Ohio.	10 00
Third, W. D. Richardson, Garden City, Minn.	5 00
2 to 3 years old, W. D. Richardson, Garden City, Minn	10 00
Second, Joe Defrees, Piqua, Ohio	7 00
Third, McCormick & Edgerly, Pataskala, Ohio	4 00
1 to 2 years old, W. D. Richardson, Garden City, Minn	8 00
Second, John Morgan, Plainfield, Ind	6 00
Third, McCormick & Edgerly, Pataskala, Ohio	3 00
Calf, Joe Defrees, Piqua, Ohio	5 00
Second, W. D. Richardson, Garden City, Minn	3 00
Third, McCormick & Edgerly, Pataskala, Ohio	2 00
Four animals, get of one sire, W. D. Richardson, Garden City, Minn .	10 00
Second, Joe Defrees, Piqua, Ohio	7 00
Two animals, produce of one cow, Joe Defrees, Piqua, Ohio	10 00
Second, W. D. Richardson, Garden City, Minn	7 00
Third, McCormick & Edgerly, Pataskala, Ohio	4 00

Exhibitor's herd, Joe Defrees, Piqua, Ohio	\$20 00
Second, W. D. Richardson, Garden City, Minn	10 00
Breeder's herd, W. D. Richardson, Garden City, Minn	20 00
Best bull, Joe Defrees, Piqua, Ohio	20 00
Best cow or heifer, Joe Defrees, Piqua, Ohio	20 00

G. Howard Davidson, Millbrook, N. Y., Judge.

DEPARTMENT F.

SHEEP.

JOHN L. THOMPSON, Superintendent.

To the President and Members of the Delegate Board:

GENTLEMEN—Anticipating the better conditions in store for their favorites, exhibitors in this department made a most creditable exhibit—equal in numbers and superior in merit to any recent shows. There were on exhibition:

Long wools	35
Fine wools	66
Southdowns	40
Rambouillets	30
Shropshires	157
Cheviots	28
Oxforddowns.	38
Tunis.	23
Hampshiredowns.	37
Total	451

The different breeds or classes were passed upon by Messrs. Cal. F. Darnall, Uriah Privett and R. Gibson, acting as single expert judges. Their careful work gave little room for complaint.

The expenses of the department were \$82, less \$25, paid by the American Shropshire Association on account of our using a judge recommended by this association.

While our present classification and division of the prize money is an improvement over any previous arrangement, yet it is not perfect, and we would suggest that it be improved by offering greater encouragement to the beginner, local breeder or "home talent," and therefore recommend that it be revised with this object in view.

AWARDS.

CLASS XIX—Long Wool, Cotswold, Leicester and Lincoln.

RAMS.

2 years old or more, Geo. Harding & Sons, Waukesha, Wis.	\$8 00
Second, Geo. Harding & Sons, Waukesha, Wis.	6 00
Third, Wilson Bros., Muncie, Ind.	4 00
1 to 2 years old, Geo. Harding & Sons, Waukesha, Wis.	8 00
Second, Geo. Harding & Sons, Waukesha, Wis.	6 00
Third, I. J. Hiller, Four Towns, Mich.	4 00
Lamb, Geo. Harding & Son, Waukesha, Wis.	8 00
Second, I. J. Hiller, Four Towns, Mich.	6 00
Third, I. J. Hiller, Four Towns, Mich.	4 00

EWES.

2 years old or over, Geo. Harding & Sons, Waukesha, Wis.	8 00
Second, Wilson Bros., Muncie, Ind.	6 00
Third, I. J. Hiller, Four Towns, Mich.	4 00
1 to 2 years old, Geo. Harding & Sons, Waukesha, Wis.	8 00
Second, Wilson Bros., Muncie, Ind.	6 00
Third, Geo. Harding, Waukesha, Wis.	4 00
Lamb, Geo. Harding & Sons, Waukesha, Wis.	8 00
Second, Geo. Harding & Sons, Waukesha, Wis.	6 00
Third, Wilson Bros., Muncie, Ind.	4 00

FLOCKS.

Aged flock, Geo. Harding & Sons, Waukesha, Wis.	8 00
Second, Wilson Bros., Muncie, Ind.	6 00
Third, Geo. Harding & Sons, Waukesha, Wis.	4 00
Young flocks, Wilson Bros., Muncie, Ind.	8 00
Second, Wilson Bros., Muncie, Ind.	6 00
Third, Geo. Harding & Sons, Waukesha, Wis.	4 00
Best ram, Geo. Harding & Sons, Waukesha, Wis.	10 00
Best ewe, Geo. Harding & Sons, Waukesha, Wis.	10 00

Richard Gibson, Delaware, Ont., Judge.

CLASS XX—Southdown.

RAMS.

2 years old or over, Geo. McKerrow, Sussex, Wis.	8 00
Second, Uriah Privett, Greensburg, Ind.	6 00
Third, Watt Wilson & Co., Muncie, Ind.	4 00

1 to 2 years old, Geo. McKerrow, Sussex, Wis	\$8 00
Second, Geo. McKerrow, Sussex, Wis.	6 00
Third, Uriah Privett, Greensburg, Ind	4 00
Lamb, Geo. McKerrow, Sussex, Wis	8 00
Second, Uriah Privett, Greensburg, Ind.	6 00
Third, Watt Wilson & Co., Muncie, Ind.	4 00

EWES.

2 years old or over, Geo. McKerrow, Sussex, Wis.	8 00
Second, Uriah Privett, Greensburg, Ind	6 00
Third, Watt Wilson, Muncie, Ind	4 00
One to two years old, George McKerrow, Sussex, Wis	8 00
Second, George McKerrow, Sussex, Wis	6 00
Third, Watt Wilson, Muncie, Ind	4 00
Lamb, George McKerrow, Sussex, Wis	8 00
Second, George McKerrow, Sussex, Wis	6 00
Third, Watt Wilson, Muncie, Ind	4 00

FLOCKS.

Aged flock, George McKerrow, Sussex, Wis	8 00
Second, George McKerrow, Sussex, Wis	6 00
Third, Uriah Privett, Greensburg, Ind	4 00
Young flock, Watt Wilson & Co., Muncie, Ind	8 00
Second, Uriah Privett, Greensburg, Ind	6 00
Best ram, George McKerrow, Sussex, Wis	10 00
Best ewe, George McKerrow, Sussex, Wis	10 00

Richard Gibson, Delaware, Ont., Judge.

CLASS XXI—Shropshires.

RAMS.

Two years old or over, J. H. Davison, Millbrook, N. Y	\$8 00
Second, Robert Miller, Broujham, Ont	6 00
Third, I. J. Williams & Son, Muncie, Ind	4 00
One to two years old, J. H. Davison, Millbrook, N. Y	8 00
Second, Robert Miller, Broujham, Ont	6 00
Third, Robert Miller, Broujham, Ont	4 00
Lamb, J. H. Davison Millbrook, N. Y	8 00
Second, Robert Miller, Broujham, Ont	6 00
Third, F. C. Yeiser, Avilla, Ind	4 00

EWES.

Two years old or over, I. J. Williams & Son, Muncie, Ind	8 00
Second, Robert Miller, Broujham, Ont	6 00
Third, J. H. Davison, Millbrook, N. Y	4 00
One to two years old, Robt. Miller, Broujham, Ont	8 00
Second, Robert Miller, Broujham, Ont	6 00
Third, Robert Miller, Broujham, Ont	4 00
Lamb, J. H. Davison, Millbrook, N. Y	8 00
Second, Robert Miller, Broujham, Ont	6 00
Third, F. C. Yeiser, Avilla, Ind	4 00

FLOCKS.

Aged flock, Robert Miller, Broujham, Ont	8 00
Second, J. H. Davison, Millbrook, N. Y	6 00
Third, I. J. Williams & Son, Muncie, Ind	4 00
Young flock, F. C. Yeiser, Avilla, Ind	8 00
Second, J. H. Davison, Millbrook, N. Y	6 00
Third, F. C. Yeiser, Avilla, Ind	4 00
Best ram, J. H. Davison, Millbrook, N. Y	10 00
Best ewe, Robert Miller, Broujham, Ont	10 00

Shropshire Special.

Aged flock, Robt. Miller, Broujham, Ont	15 00
Second, J. H. Davison, Millbrook, N. Y	10 00
Flock, four lambs, J. H. Davison, Millbrook, N. Y	15 00
Second, Robt. Miller, Broujham, Ont	10 00
Flock, lambs bred by exhibitor, F. C. Yeiser, Avilla, Ind	15 00
Second, F. C. Yeiser, Avilla, Ind	10 00

Richard Gibson, Delaware, Ont., Judge.

CLASS XXII—Oxforddown.

RAMS.

2 years old or over, Geo. McKerrow, Sussex, Wis	\$8 00
Second, J. C. Williamson, Xenia, O	6 00
Third, Sid Conger, Flatrock, Ind	4 00
1 to 2 years old, Geo. McKerrow, Sussex, Wis.	8 00
Second, J. C. Williamson, Xenia, O	6 00
Third, Sid Conger, Flatrock, Ind	4 00
Lamb, Geo. McKerrow, Sussex, Wis	8 00
Second, Sid Conger, Flatrock, Ind	6 00
Third, J. C. Williamson, Xenia, O	4 00

EWES.

2 years old or over, Geo. McKerrow, Sussex, Wis	\$8 00
Second, J. C. Williamson, Xenia, O	6 00
Third, Uriah Privett & Co. Greensburg, Ind	4 00
1 to 2 years old, J. C. Williamson, Xenia, O	8 00
Second, Geo. McKerrow, Sussex, Wis	6 00
Third, Uriah Privett & Co., Greensburg, Ind	4 00
Lamb, Geo. McKerrow, Sussex, Wis	8 00
Second, J. C. Williamson, Xenia, O	6 00
Third, Geo. McKerrow, Sussex, Wis	4 00

FLOCKS.

Aged flock, Geo. McKerrow, Sussex, Wis	8 00
Second, J. C. Williamson, Xenia, O	6 00
Third, Geo. McKerrow, Sussex, Wis	4 00
Young flock, Geo. McKerrow, Sussex, Wis	8 00
Second, Wilson Bros., Muncie, Ind	6 00
Third, Sid Conger, Flatrock, Ind	4 00
Best ram, Geo. McKerrow, Sussex, Wis	10 00
Best ewe, J. C. Williamson, Xenia, O	10 00

Oxford Special.

Pen of four lambs, Sid Conger, Flatrock, Ind	15 00
Second, Wilson Bros., Muncie, Ind	10 00
Ram, Sid Conger, Flatrock, Ind	15 00
Second, Sid Conger, Flatrock, Ind	10 00
Pen ewes, Sid Conger, Flatrock, Ind	15 00
Second, Sid Conger, Flatrock, Ind	10 00

Richard Gibson, Delaware, Ont., Judge.

CLASS XXIII—Hampshire Down.

RAMS.

2 years old or over, John Milton, Marshall, Mich	\$8 00
Second, I. J. Hiller, Four Towns, Mich	6 00
Third, Foster & Guthry, Deputy, Ind	4 00
1 to 2 years old, John Milton, Marshall, Mich	8 00
Second, I. J. Hiller, Four Towns, Mich	6 00
Third, I. J. Hiller, Four Towns, Mich	4 00
Lamb, I. J. Hiller, Four Towns, Mich	8 00
Second, John Milton, Marshall, Mich	6 00
Third, John Milton, Marshall, Mich	4 00

EWFS.

2 years old or more, I. J. Hiller, Four Towns, Mich	\$8 00
Second, I. J. Hiller, Four Towns, Mich	6 00
Third, John Milton, Marshall, Mich	4 00
1 to 2 years old, John Milton, Marshall, Mich	8 00
Second, John Milton, Marshall, Mich	6 00
Third, I. J. Hiller, Four Towns, Mich	4 00
Lamb, I. J. Hiller, Four Towns, Mich	8 00
Second, John Milton, Marshall, Mich	6 00
Third, John Milton, Marshall Mich	4 00

FLOCKS.

Aged flocks, John Milton, Marshall, Mich	8 00
Second, I. J. Hiller, Four Towns, Mich	6 00
Third, Foster & Guthrie, Deputy, Ind	4 00
Best ram, John Milton, Marshall, Mich	10 00
Young flock, John Milton, Marshall, Mich	8 00
Best ewe, John Milton, Marshall, Mich	10 00

Richard Gibson, Delaware, Ont., Judge.

CLASS XXIV—*Fine Wool, American, Spanish and Delaine Merino.*

RAMS.

2 years old or over, F. W. Perkins, West Mansfield, Ohio	\$8 00
Second, R. D. Williamson, Syracuse, N. Y	6 00
Third, F. E. Shopp, Paris, Ill	4 00
1 to 2 years old, A. T. Gambler, Wakeman, Ohio	8 00
Second, R. D. Williamson, Syracuse, N. Y	6 00
Third, Uriah Cook, West Mansfield, Ohio	4 00
Lamb, Uriah Cook, West Mansfield, Ohio	8 00
Second, R. D. Williamson, Syracuse, N. Y	6 00
Third, R. D. Williamson, Syracuse, N. Y	4 00

EWES.

2 years old or over, Uriah Cook, West Mansfield, Ohio	8 00
Second, R. D. Williamson, Syracuse, N. Y	6 00
Third, F. E. Shopp, Paris, Ill	4 00
1 to 2 years old, F. E. Shopp, Paris, Ill	8 00
Second, R. D. Williamson, Syracuse, N. Y	6 00
Third, A. T. Gambler, Wakeman, Ohio	4 00
Lamb, R. D. Williamson, Syracuse, N. Y	8 00
Second, Uriah Cook, West Mansfield, Ohio	6 00
Third, F. W. Perkins, West Mansfield, Ohio	4 00

FLOCKS.

Aged flocks, R. D. Williamson, Syracuse, N. Y	\$8 00
Second, Uriah Cook, West Mansfield, Ohio	6 00
Third, A. T. Gambler, Wakeman, O	4 00
Young flock, F. W. Perkins, West Mansfield, O	8 00
Second, R. D. Williamson, Syracuse, N. Y	6 00
Third, F. E. Shopp, Paris, Ill	4 00
Best ram, F. W. Perkins, West Mansfield, O	10 00
Best ewe, Uriah Cook, West Mansfield, O	10 00

CLASS XXV—*Rambouillets.*

RAMS.

Two years old or over, A. A. Bates, Irwin, O	\$3 00
Second, O. E. Lincoln & Son, Milford Center, O	2 00
Third, O. E. Lincoln & Son, Milford Center, O	1 00
One to two years old, O. E. Lincoln & Son, Milford Center, O	3 00
Second, A. A. Bates, Irwin, O	2 00
Third, A. A. Bates, Irwin, O	1 00
Lamb, A. A. Bates, Irwin, O	3 00
Second, A. A. Bates, Irwin, O	2 00
Third, O. E. Lincoln & Son, Milford Center, O	1 00

EWES

Two years old or over, O. E. Lincoln & Son, Milford Center, O	3 00
Second, A. A. Bates, Irwin, O	2 00
Third, O. E. Lincoln & Son, Milford Center, O	1 00
One to two years old, O. E. Lincoln & Son, Milford Center, O	3 00
Second, O. E. Lincoln & Son, Milford Center, O	2 00
Third, O. E. Lincoln & Son, Milford Center, O	1 00
Lamb, A. A. Bates, Irwin, O	3 00
Second, A. A. Bates, Irwin, O	2 00
Third, O. E. Lincoln & Son, Milford Center, O	1 00

FLOCKS.

Aged flocks, A. A. Bates, Irwin, O	6 00
Second, O. E. Lincoln & Son, Milford Center, O	4 00
Third, O. E. Lincoln & Son, Milford Center, O	2 00
Young flock, A. A. Bates, Irwin, O	6 00
Second, O. E. Lincoln & Son, Milford Center, O	4 00
Third, O. E. Lincoln & Son, Milford Center, O	2 00
Best ram, A. A. Bates, Irwin, O	8 00
Best ewe, O. E. Lincoln & Son, Milford Center, O	8 00

CLASS XXVII—*Cheviot.*

RAMS.

Two years old or over, I. J. Hiller, Four Towns, Mich	\$3 00
Second, Wm. S. Crodian, Camden, O	2 00
Third, Wm. S. Crodian, Camden, O	1 00
One to two years old, Wm. S. Crodian, Camden, O	3 00
Second, Wm. S. Crodian, Camden, O	2 00
Third, Wm. S. Crodian, Camden, O	1 00
Lamb, Wm. S. Crodian, Camden, O	3 00
Second, Wm. S. Crodian, Camden, O	2 00
Third, I. J. Hiller, Four Towns, Mich	1 00

EWES.

Two years old or over, I. J. Hiller, Four Towns, Mich	3 00
Second, Wm. S. Crodian, Camden, O	2 00
Third, William S. Crodian, Camden, O	1 00
1 to 2 years old, I. J. Hiller, Four Towns, Mich	3 00
Second, William S. Crodian, Camden, O	2 00
Third, William S. Crodian, Camden, O	1 00
Lamb, William S. Crodian, Camden, O	3 00
Second, William S. Crodian, Camden, O	2 00
Third, I. J. Hiller, Four Towns, Mich	1 00

FLOCKS.

Aged flocks, I. J. Hiller, Four Towns, Mich	6 00
Second, William S. Crodian, Camden, O	4 00
Third, William S. Crodian, Camden, O	2 00
Young flocks, William S. Crodian, Camden, O	6 00
Best ram, I. J. Hiller, Four Towns, Mich	8 00
Best ewe, I. J. Hiller, Four Rivers, Mich	8 00

Richard Gibson, Delaware, Ont., Judge.

CLASS XXVIII—*Tunis.*

RAMS.

2 years old or over, J. A. Guilliams, Fincastle, Ind	\$3 00
1 to 2 years old, J. A. Guilliams, Fincastle, Ind	3 00
Second, Charles Roundtree, Yountsville, Ind	2 00
Lamb, J. A. Guilliams, Fincastle, Ind	3 00
Second, Charles Roundtree, Yountsville, Ind	2 00
Third, Charles Roundtree, Yountsville, Ind	1 00

EWES

2 years old or over, J. A. Guilliams, Fincastle, Ind	\$3 00
Second, Charles Roundtree, Yountsville, Ind	2 00
1 to 2 years old, J. A. Guilliams, Fincastle, Ind	3 00
Lamb J. A. Guilliams, Fincastle, Ind	3 00
Second, J. A. Guilliams, Fincastle, Ind	2 00
Third, Charles Roundtree, Yountsville, Ind	1 00

FLOCKS.

Aged flocks, J. A. Guilliams, Fincastle, Ind	6 00
Young flocks, Charles Roundtree, Yountsville, Ind	6 00
Best ram, J. A. Guilliams, Fincastle, Ind	8 00
Best ewe, J. A. Guilliams, Fincastle, Ind	8 00

Cal. F. Darnell, Indianapolis, Judge.

DEPARTMENT G.

SWINE.

H. B. HOWLAND, Superintendent.

To the Indiana Delegate Board of Agriculture:

MR. PRESIDENT AND GENTLEMEN—As Superintendent of the Swine Department for 1896 I desire to submit the following: I have nothing but words of praise for the treatment received at the hands of the exhibitors in this department, and am of the opinion that they feel as kindly to the Board and the management. I found a perfect willingness to comply with every rule of the list, and to render such aid as was in their power to have the exhibit a success. I do not think that changes can be made that would better the classification in this department, and, therefore, would recommend that the classes and prizes offered be continued.

The number of entries in the various classes in this department was as follows:

Class 29, Berkshires, 187; Class 30, Poland-Chinas, 141; Class 31, Chester Whites, Victorias, Cheshires and Large Yorkshires, 139; Class 32, Duroc, Jersey and Tamworths, 124; Class 33, Essex, Suffolk and Small Yorkshires, 116. Total entries, 707.

Expense of department, \$78.90.

The awards in the Swine Department were as follows:

AWARDS.

CLASS XXIX—*Berkshires.*

BOARS.

2 years old or over, Connell & Son, Fayette, O	\$12 00
Second, John F. Stover, New Lancaster, Ind	8 00
Third, A. D. Gilmore, Greensburg, Ind.	4 00
1 to 2 years old, J. Riley, Thorntown, Ind	10 00
Second, J. A. Myers, Hagerstown, Ind	7 00
Third, W. H. Hughes, Brownsburg, Ind	3 00
6 months to 1 year, J. Riley, Thorntown, Ind	8 00
Second, John F. Stover, New Lancaster, Ind	5 00
Third, A. S. Gilmore, Greensburg, Ind.	2 00
Under six months, A. S. Gilmore, Greensburg, Ind.	8 00
Second, I. N. Barker, Thorntown, Ind	5 00
Third, A. S. Gilmore, Greensburg, Ind.	2 00

SOWS.

Two years old or over, Connell & Son, Fayette, Ohio	12 00
Second, W. S. Hughes, Brownsburg, Ind	8 00
Third, J. Riley, Thorntown, Ind.	4 00
One to two years old, W. H. Hughes, Brownsburg, Ind.	10 00
Second, John F. Stover, New Lancaster, Ind.	7 00
Third, O. P. Wolcott & Son, Conover, Ohio	3 00
Six months to one year old, Connell & Son, Fayette, Ohio	8 00
Second, ————	5 00
Third, O. P. Wolcott & Son, Conover, Ohio	2 00
Under six months old, I. N. Barker, Thorntown, Ind.	8 00
Second, I. N. Barker, Thorntown, Ind.	5 00
Third, I. N. Barker, Thorntown, Ind.	2 00
Aged herd, Connell & Son, Fayette, Ohio	20 00
Second, J. Riley, Thorntown, Ind.	10 00
Young herd, I. N. Barker, Thorntown, Ind.	15 00
Second, J. Riley, Thorntown, Ind	10 00
Five pigs, get of boar, A. S. Gilmore, Greensburg, Ind.	12 00
Second, I. N. Barker, Thorntown, Ind.	8 00
Five pigs, produce of sow, I. N. Barker, Thorntown, Ind.	12 00
Second, A. S. Gilmore, Greensburg, Ind.	8 00
Five pigs under six months, I. N. Barker, Thorntown, Ind.	12 00
Second, A. S. Gilmore, Greensburg, Ind.	8 00
Boar, J. E. Myers, Hagerstown, Ind.	20 00
Sow, W. H. Hughes, Brownsburg, Ind.	20 00

W. A. Maze, Sharpsville, Ind., Judge.

CLASS XXX—Poland China.

BOARS.

Two years old or over, Robinson Bros. & Hill, Winchester, Ind.	\$12 00
Second, B. F. Dorsey & Sons, Perry, Ill.	8 00
Third, Wilkins & Son, New Lancaster, Ind.	4 00
One to two years old, W. O. Reveal, 174 Central Ave., Indianapolis . . .	10 00
Second, R. L. Bebout, Rushville, Ind.	5 00
Third, Robinson Bros. & Hill, Winchester, Ind	3 00
Six to twelve months old, Wilkins & Sons, New Lancaster, Ind.	8 00
Second, W. O. Reveal, 174 Central Ave., Indianapolis	5 00
Third, Robinson Bros. & Hill, Winchester, Ind.	2 00
Under six months, Wilkins & Son, New Lancaster, Ind.	8 00
Second, Robinson Bros. & Hill, Winchester, Ind.	5 00
Third, B. F. Dorsey & Sons, Perry, Ill	2 00

SOWS.

Two years old or over, Wilkins & Sons, New Lancaster, Ind	12 00
Second, B. F. Dorsey, Perry, Ill	8 00
Third, Wilkins & Sons, New Lancaster, Ind.	4 00
One to two years old, John G. Allen, Millville, Ind.	10 00
Second, B. F. Dorsey & Sons, Perry, Ill.	7 00
Third, B. F. Dorsey & Sons, Perry, Ill	3 00
Six to twelve months, W. O. Reveal, 174 Central Ave., Indianapolis . . .	8 00
Second, B. F. Dorsey & Sons, Perry, Ill	5 00
Third, Robinson Bros. & Hill, Winchester, Ind	2 00
Under six months, W. O. Reveal, 175 Central Ave., Indianapolis	8 00
Second, Wilkins & Sons, New Lancaster, Ind	5 00
Third, Robinson Bros. & Hill, Winchester, Ind	2 00

HERDS.

Boar and three sows, over one year, B. F. Dorsey, Perry, Ill	20 00
Second, Wilkins & Sons, New Lancaster, Ind	10 00
Boar and three sows under one year, Wilkins & Sons, New Lancaster . .	15 00
Second, Robinson Bros. & Hill, Winchester, Ind	10 00
Five pigs, get of boar, Wilkins & Sons, New Lancaster, Ind	12 00
Second, W. O. Reveal, 174 Central Ave., Indianapolis	8 00
Five pigs, produce of sow, Robinson Bros. & Hill, Winchester, Ind . . .	12 00
Five pigs under six months, T. E. Lindley, Russiaville, Ind	12 00
Second, Thomas W. Tuttle, Muncie, Ind	8 00
Boar, any age, W. O. Reveal, 174 Central Ave., Indianapolis	20 00
Sow, any age, John G. Allen, Millville, Ind	20 00

Adam F. May, Flatrock, Ind., Judge.

CLASS XXXI—Chester White, Victoria, Cheshire and Large Yorkshire.

BOARS.

Two years old or over, W. H. Lagrange & Son, Franklin, Ind	\$12 00
Second, F. A. Branch, Medina, O	8 00
Third, George Ineichen, Mill Creek, Mich	4 00
One to two years old, F. E. Bone, Tallula, Ill	10 00
Second, George Ineichen, Mill Creek, Mich	7 00
Third, George Ineichen, Mill Creek, Mich	3 00
Six to twelve months, S. H. Martin, Alexandria, O.	8 00
Second, W. H. Lagrange & Son, Franklin, Ind	5 00
Third, George Ineichen, Mill Creek, Mich	2 00
Under six months, W. H. Lagrange & Son, Franklin, Ind	8 00
Second, F. A. Branch, Medina, O	5 00
Third, S. H. Martin, Alexandria, O	2 00

SOWS.

Two years old or over, W. H. Lagrange & Son, Franklin, Ind	12 00
Second, F. E. Bone, Tallula, Ill	8 00
Third, W. H. Lagrange & Son, Franklin, Ind	4 00
One to two years old, F. A. Branch, Medina, O	10 00
Second, W. H. Lagrange & Son, Franklin, Ind	7 00
Third, W. H. Lagrange & Son, Franklin, Ind	3 00
Six months to twelve months, W. H. Lagrange & Son, Franklin, Ind . .	8 00
Second, F. A. Branch, Medina, O	5 00
Third, George Ineichen, Mill Creek, Mich	2 00
Under six months, George Ineichen, Mill Creek, Mich	8 00
Second, F. A. Branch, Medina, O	5 00
Third, S. H. Martin, Alexandria, O	2 00

HERDS.

Boar and three sows over one year, W. H. Lagrange & Son, Franklin, Ind.	20 00
Second, F. E. Bone, Tallula, Ill	10 00
Boar and three sows under one year, F. E. Bone, Tallula, Ill	15 00
Second, W. H. Lagrange & Son, Franklin, Ind	10 00
Five pigs, get of boar, F. E. Bone, Tallula, Ill.	12 00
Second, F. E. Bone, Tallula, Ill	8 00
Five pigs, produce of sow, F. E. Bone, Tallula, Ill.	12 00
Second, F. A. Branch, Medina, O	8 00
Five pigs, under six months, S. H. Martin, Alexandria, O	12 00
Second, F. A. Branch, Medina, O	8 00
Boar, any age, F. A. Branch, Medina, O	20 00
Sow, any age, W. H. Lagrange & Son, Franklin, Ind	20 00

G. A. Stanton, Greenwood, Ind., Judge.

CLASS XXXII—Duroc, Jersey and Tamworth.

BOARS.

Two years old or over, G. W. Tron, Omaha, Neb.	\$12 00
Second, W. B. Cline, Camden, Ohio	8 00
Third, G. W. Tron, Omaha, Neb.	4 00
One to two years old, G. W. Tron, Omaha, Neb	10 00
Second, Thomas Bennett, Rossville, Ill	7 00
Third, O. Walter & Bros., Lebanon, Ind	3 00
Six months to one year, O. Walter & Bros., Lebanon, Ind.	8 00
Second, G. W. Tron, Omaha, Neb	5 00
Third, L. Moorman, Winchester, Ind.	2 00
Under six months, G. W. Tron, Omaha, Neb	8 00
Second, L. Moorman, Winchester, Ind	5 00
Third, Marion Schultz, Zionsville, Ind	2 00

SOWS.

Two years old or over, G. W. Titsworth, Orange, Ind	\$12 00
Second, O. Walter & Bros., Lebanon, Ind.	8 00
Third, J. R. Sturgeon, Churubusco, Ind	4 00
One to two years old, G. W. Tron, Omaha, Neb	10 00
Second, J. R. Sturgeon, Churubusco, Ind	7 00
Third, O. Walter & Bros., Lebanon, Ind	3 00
Six months to one year, O. Walter & Bros., Lebanon, Ind.	8 00
Second, W. B. Cline, Camden, Ohio	5 00
Third, J. R. Sturgeon, Churubusco, Ind	2 00
Under six months, L. Moorman, Winchester, Ind	8 00
Second, G. W. Tron, Omaha, Neb	5 00
Third, L. Moorman, Winchester, Ind.	2 00
Boar and three sows over one year, G. W. Tron, Omaha, Neb	20 00
Second, O. Walter & Bros., Lebanon, Ind	10 00
Boar and three sows under one year, O. Walter & Bros., Lebanon, Ind.	15 00
Second, L. Moorman, Winchester, Ind	10 00
Five pigs, get of boar, L. Moorman, Winchester, Ind.	12 00
Second, Marion Schultz, Zionsville, Ind	8 00
Five pigs, produce of sow, L. Moorman, Winchester, Ind.	12 00
Second, Thos. Bennett, Rossville, Ill	8 00
Five pigs under six months, L. Moorman, Winchester, Ind	12 00
Second, Thos. Bennett, Rossville, Ill	8 00
Boar any age, O. Walter & Bros., Lebanon, Ind.	20 00
Sow any age, G. W. Titsworth, Orange, Ind.	20 00

Adam F. May, Flatrock, Ind., Judge.

CLASS XXXIII—Essex, Suffolk and Small Yorkshire.

BOARS.

Two years old or over, Alva C. Green, Winchester, Ind.	\$6 00
Second, Bascom & McMurry, California, Mich	4 00
Third, Alva C. Green, Winchester, Ind.	2 00
One to two years old, A. C. Green, Winchester, Ind	5 00
Second, Bascom & McMurry, California, Mich	3 00
Third, Geo. Ineichen, Mill Creek, Mich.	2 00
Six to twelve months, Bascom & McMurry, California, Mich	4 00
Second, Alva C. Green, Winchester, Ind.	3 00
Third, Geo. Ineichen, Mill Creek, Mich.	2 00
Under six months, Bascom & McMurry, California, Mich	4 00
Second, Alva C. Green, Winchester, Ind	3 00
Third, Geo. Ineichen, Mill Creek, Mich	2 00

SOWS.

Two years old or over, Bascom & McMurry, California, Mich.	6 00
Second, C. P. Deckerman, Mallet Creek, Ohio	4 00
Third, Bascom & McMurry, California, Mich	2 00
One to two years old, Bascom & McMurry, California, Mich	5 00
Second, Alva C. Green, Winchester, Ind	3 00
Third, Alva C. Green, Winchester, Ind.	2 00
Six months to one year, Bascom & McMurry, California, Mich	4 00
Second, Alva C. Green, Winchester, Ind	3 00
Third, Geo. Ineichen, Mill Creek, Mich	2 00
Under six months, Bascom & McMurry, California, Mich	4 00
Second, Bascom & McMurry, California, Mich	3 00
Third, Bascom & McMurry, California, Mich	2 00

HERDS.

Boar and three sows over one year, Bascom & McMurry, California, Mich.	10 00
Second, Alva C. Green, Winchester, Ind	5 00
Boar and three sows under one year, Bascom & McMurry, California, Mich	8 00
Second, C. P. Deckerman, Mallet Creek, Ohio	5 00
Five pigs get of boar, Bascom & McMurry, California, Mich	6 00
Second, C. P. Deckerman, Mallet Creek, Ohio	4 00
Five pigs produce of sow, C. P. Deckerman, Mallet Creek, Ohio	6 00
Second, Geo. Ineichen, Mill Creek, Mich	4 00
Five pigs under six months, Bascom & McMurry, California, Mich	6 00
Second, C. P. Deckerman, Mallet Creek, Ohio	4 00
Boar, any age, Bascom & McMurry, California, Mich	10 00
Sow, any age, Bascom & McMurry, California, Mich	10 00

G. A. Stanton, Judge.

DEPARTMENT H.

POULTRY.

 JOHN C. HAINES, Superintendent.

Mr. President and Members of the Delegate Board of Agriculture:

It affords me pleasure to be able to report one of the largest and finest displays of poultry ever exhibited at the Indiana State Fair, comprising a great number of high-class birds of all varieties enumerated in the list, as also a number of varieties not listed, from which, I believe, some deserving might be selected for future lists. Most classes afforded very strong competition, and special mention of some would not be out of place, if time and space would permit.

The Poultry Department, in the matter of room, light and coops, afforded very good accommodation for the exhibit, and I would recommend a different fastening to the coop doors. The doors, as now fastened, drop into a small socket made to receive the lower end of door bars; the socket becomes filled and fails to hold the bars secure, causing much trouble and annoyance to the exhibitor and Superintendent. The professional poultry raiser furnished the largest part of the exhibits, Indiana taking the lead, followed by Michigan, Illinois, Ohio and Texas, in order named.

The department display was very materially aided by private contribution of many fine birds, to the pleasure of visitors.

In conclusion will say, I feel that the poultry exhibits should be encouraged by liberal premiums, and every legitimate encouragement given to an industry that means so much pleasure and profit to Indiana agriculturists.

The pet stock show, which was held in one wing of the poultry building, was well attended, and they exhibited many fine specimens in their line, which attracted the attention of the visitors very much, and should always have a place in poultry building, as long as room will permit.

There were fifty-seven exhibits, from which Indiana furnished fifty.

As to the number of entries of each breed, we find the—

Barred Plymouth Rock leads with	109
Plymouth Rock, white	88
Wyandotts, white	58
Wyandotts, silver	38
Wyandotts, golden	11
Brahmas, light	60
Brahmas, dark	20
Cochins, buff	46
Cochins, partridge	40
Cochins, white	34
Cochins, black	25

Langshans, black	83
Langshans, white	26
Games, black breasted	48
Games, Cornish Indian	35
Games, red pile	17
Leghorn, white, S. C.	60
Leghorn, white, R. C.	21
Leghorn, brown, S. C.	65
Leghorn, brown, R. C.	36
Leghorn, buff	33
Leghorn, black	15
Houdan	36
Black Spanish, white face	30
Hamburg, golden	18
Hamburg, silver	40
Hamburg, black	13
Polish, W. C. B.	9
Polish, golden	8
Polish, silver	6
Minorcas, black.	48
Java	16
Dorkings.	15
Red Caps	10
Bantams, seabright golden	29
Bantams, silver	9
Bantams, Japanese	15
Bantams, R. C.	13
Game, black breasted	36
Game, silver duck wing	50
Game, red pile	18
Game, brown red	19
Buff Cochins	21
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Making total single entries in chicks, breeding pens consisting of	1,427
1 male, 4 female entries	140
Turkeys, entries	29
Geese, entries	18
Ducks, entries	25
Miscellaneous entries	10
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Total entries	1,649

Making a grand total of over 2,000 specimens that were entered for competition.

Mr. Charles McClave, of New London, Ohio, who officiated as judge, proved worthy of the confidence reposed in him, and in an eminent degree gave universal satisfaction.

The total expense of the department, \$82.65.

AWARDS.

CLASS XXXIV—*Asiatic.*

Light Brahma cock, Jno. Morgan, Plainfield, Ind	\$2 00
Second, Jno. Morgan, Plainfield, Ind.	1 00
Light Brahma hen, Jno. Morgan, Plainfield, Ind	2 00
Second, Sid Conger, Flatrock, Ind	1 00
Light Brahma cockerel, Sid Conger, Flatrock, Ind.	2 00
Second, J. H. Horning, Sunman, Ind.	1 00
Light Brahma pullet, Jno. Morgan, Plainfield, Ind	2 00
Second, Sid Conger, Flatrock, Ind	1 00
Dark Brahma cock, B. F. Duncan, Greenfield, Ind.	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00
Dark Brahma hen, A. W. Porter, Maywood, Ind	2 00
Second, F. H. Buck, Morristown, Ind	1 00
Dark Brahma cockerel, R. E. Leonard, Gem, Ind	2 00
Second, R. E. Leonard, Gem, Ind	1 00
Dark Brahma pullet, R. E. Leonard, Gem, Ind	2 00
Second, R. E. Leonard, Gem, Ind	1 00
Buff Cochin cock, W. R. Zike & Sons, Morristown, Ind	2 00
Second, J. J. Burnside, Milligan, Ind	1 00
Buff Cochin hen, J. J. Burnside, Milligan, Ind	2 00
Buff Cochin cockerel, C. Matthews, Manilla, Ind	2 00
Second, W. R. Zike & Sons, Morristown, Ind	1 00
Buff Cochin pullet, C. Matthews & Sons, Manilla, Ind	2 00
Second, C. Matthews & Sons, Manilla, Ind	1 00
Partridge Cochin cock, R. E. Leonard, Gem, Ind	2 00
Second, Warbert & Bros., Ladoga, Ind	1 00
Partridge Cochin hen, Warbert & Bros., Ladoga, Ind	2 00
Second, R. E. Leonard, Gem, Ind	1 00
Partridge Cochin cockerel, Sid Conger, Flatrock, Ind	2 00
Second, W. R. Zike & Sons, Morristown, Ind	1 00
Partridge Cochin pullet, F. W. Buck, Morristown, Ind	2 00
Second, W. R. Zike & Sons, Morristown, Ind	1 00
White Cochin cock, R. G. Baxter, Hillsdale, Mich.	2 00
Second, Warbert & Bros., Ladoga, Ind	1 00
White Cochin hen, W. O. Swan, Manilla, Ind.	2 00
Second, F. N. Smiley, Milligan, Ind	1 00
White Cochin cockerel, Warbert & Bros	2 00
Second, W. O. Swan, Manilla, Ind	1 00
White Cochin pullet, W. O. Swan, Manilla, Ind.	2 00
Second, W. O. Swan, Manilla, Ind	1 00
Black Cochin cock, G. R. Baxter, Hillsdale, Mich	2 00
Second, F. H. Buck, Morristown, Ind.	1 00
Black Cochin hen, B. F. Hill, Keystone Hotel, Indianapolis	2 00

Second, Warbert & Bros., La'oga, Ind	\$1 00
Black Cochin cockerel, B. F. Hill, Keystone Hotel, Indianapolis . . .	2 00
Second, B. F. Hill, Keystone Hotel, Indianapolis	1 00
Black Cochin pullet, B. F. Hill, Keystone, Ind	2 00
Second, B. F. Hill, Keystone, Ind	1 00
Black Langshan cock, C. G. Robinson, Mason, Mich.	2 00
Second, Sid Conger, Flatrock, Ind	1 00
Black Langshan hen, C. G. Robinson, Mason, Mich	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Black Langshan cockerel, C. G. Robinson, Mason, Mich	2 00
Second, Sid Conger, Flatrock, Ind	1 00
Black Langshan pullet, C. G. Robinson, Mason, Mich	2 00
Second, C. G. Robinson, Mason, Mich	1 00
White Langshan cock, F. N. Smiley, Milligan, Ind	2 00
Second, A. H. Pickett, Darlington, Ind	1 00
White Langshan hen, A. H. Pickett, Darlington, Ind	2 00
Second, A. H. Pickett, Darlington, Ind	1 00
White Langshan cockerel, W. A. Crauer, Fillmore, Ind	2 00
Second, F. N. Smiley, Milligan, Ind	1 00
White Langshan pullet, W. A. Crauer, Fillmore, Ind.	2 00
Second, W. A. Crauer, Fillmore, Ind	1 00

AMERICAN.

Barred Plymouth Rock cock, W. R. Zike & Sons, Morristown, Ind . . .	\$2 00
Second, Sid Conger, Flatrock, Ind	1 00
Barred Plymouth Rock hen, Sid Conger, Flatrock, Ind.	2 00
Second, P. Six, Gwinneville, Ind	1 00
Barred Plymouth Rock cockerel, Meyers & Hutchinson, Crawfordsville, Ind.	2 00
Second, P. Six, Gwinneville, Ind	1 00
Barred Plymouth Rock pullet, Sid Conger, Flatrock Ind	2 00
Second, Allen Bros., Samong, Ind	1 00
White Plymouth Rock cock, Thos. Cory, New Carlisle, Ind.	2 00
Second, R. M. Gard, Frankfort, Ind	1 00
White Plymouth Rock hen, R. M. Gard, Frankfort, Ind	2 00
Second, J. B. Flathers, Mapleton, Ind	1 00
White Plymouth Rock cockerel, Warbert & Bros., Ladoga, Ind	2 00
Second, A. N. Black, Greencastle, Ind	1 00
White Plymouth Rock pullet, R. M. Gard, Frankfort, Ind	2 00
Second, R. M. Gard, Frankfort, Ind	1 00
Silver Wyandotte cock, Allen Bros, Samong, Ind	2 00
Second, F. N. Smiley, Milligan, Ind	1 00
Silver Wyandotte hen, F. N. Smiley, Milligan, Ind	2 00
Second, H. J. Horning, Sunman, Ind	1 00
Silver Wyandotte cockerel, B. F. Duncan, Greenfield, Ind	2 00

Second, J. H. Horning, Sunman, Ind.	\$1 00
Silver Wyandotte pullet, J. H. Horning, Sunman, Ind.	2 00
Second, E. E. Sanders, Kokomo, Ind	1 00
Golden Wyandotte cock, J. H. Horning, Sunman, Ind	2 00
Second, J. J. Burnside, Milligan, Ind	1 00
Golden Wyandotte hen, J. H. Horning, Sunman, Ind	2 00
Second, J. J. Burnside, Milligan, Ind.	1 00
Golden Wyandotte cockerel, J. J. Burnside, Milligan, Ind	2 00
Second, H. Bloom, Brightwood, Ind	1 00
Golden Wyandotte pullet, H. Bloom, Brightwood, Ind.	2 00
Second, J. J. Burnside, Milligan, Ind	1 00
White Wyandotte cock, J. H. Horning, Sunman, Ind	2 00
Second, J. B. Flathers, Mapleton, Ind	1 00
White Wyandotte hen, J. H. Horning, Sunman, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
White Wyandotte cockerel, Howard Johnson, Howland, Ind	2 00
Second, J. H. Horning, Sunman, Ind	1 00
White Wyandotte pullet, J. H. Horning, Sunman, Ind	2 00
Second, J. H. Horning, Sunman, Ind	1 00

GAME.

Black breasted red cock, W. Lanius, Greensburg, Ind	\$2 00
Second, W. Lanius, Greensburg, Ind	1 00
Black breasted red hen, W. Lanius, Greensburg, Ind	2 00
Second, G. H. Gilliams, Fincastle, Ind	1 00
Black breasted red cockerel, W. Lanius, Greensburg, Ind	2 00
Second, W. Lanius, Greensburg, Ind	1 00
Black breasted red pullet, W. Lanius, Greensburg, Ind	2 00
Second, W. Lanius, Greensburg, Ind	1 00
Cornish Indian cock, W. Lanius, Greensburg, Ind	2 00
Second, Thos. Gregory, Fontanet, Ind.	1 00
Cornish Indian hen, Allen Bros., Samong, Ind	2 00
Second, Warbert & Bros. Ladoga, Ind	1 00
Cornish Indian cockerel, J. B. Landwer, Newcastle, Ind	2 00
Second, R. E. Leonard, Gem, Ind	1 00
Cornish Indian pullet, J. B. Landwer, Newcastle, Ind	2 00
Second, J. B. Landwer, Newcastle, Ind	1 00
Red pile cock, W. Lanius, Greensburg, Ind	2 00
Second, W. Lanius, Greensburg, Ind	1 00
Red pile hen, W. Lanius, Greensburg, Ind	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Red pile cockerel, W. Lanius, Greensburg, Ind	2 00
Red pile pullet, W. Lanius, Greensburg, Ind	2 00

LEGHORN.

White cock (S. C.), Wm. Tobin, 173 W. Morris Street, Indianapolis . . .	\$2 00
Second, Wm. Tobin, 173 W. Morris Street, Indianapolis	1 00
White hen (S. C.), Wm. Tobin, 173 W. Morris Street, Indianapolis . . .	2 00
Second, Wm. Tobin, 173 W. Morris Street, Indianapolis	1 00
White cockerel (S. C.), A. H. Pickett, Darlington, Ind.	2 00
Second, Wm. Tobin, 173 W. Morris Street, Indianapolis	1 00
White pullet (S. C.), Wm. Tobin, 173 W. Morris Street, Indianapolis . .	2 00
Second, J. J. Burnside, Milligan, Ind	1 00
White cock (R. C.), R. G. Baxter, Hillsdale, Mich.	2 00
Second, F. M. Smiley, Milligan, Ind	1 00
White hen (R. C.), R. E. Leonard, Gem, Ind	2 00
Second, R. E. Leonard, Gem, Ind	1 00
White cockerel, R. E. Leonard, Gem, Ind	2 00
Second, R. G. Baxter, Hillsdale, Mich	1 00
White pullet, R. E. Leonard, Gem, Ind	2 00
Second, R. G. Baxter, Hillsdale, Mich	1 00
Brown cock (S. C.), W. O. Swan, Manilla, Ind.	2 00
Second, W. L. Hagedon, 84 Greer Street, Indianapolis	1 00
Brown hen, (S. C.) E. B. Murphy, Carmel, Ind	2 00
Second, E. B. Murphy, Carmel, Ind	1 00
Brown cockerel, W. L. Hagedon, 84 Greer Street, Indianapolis	2 00
Second, W. L. Hagedon, 84 Greer Street, Indianapolis	1 00
Brown pullet, E. B. Murphy, Carmel, Ind	2 00
Brown cock, (R. C.) Thos. Cory, New Carlisle, Ind	2 00
Second, Peter Stony, Shelbyville, Ind	1 00
Brown hen (R. C.) F. N. Smiley, Milligan, Ind	2 00
Second, C. R. Milhouse, 163 Prospect Street, Indianapolis	1 00
Brown cockerel, F. N. Smiley, Milligan, Ind	2 00
Second, C. R. Millhouse, 163 Prospect Street, Indianapolis	1 00
Brown pullet, Peter Stony, Shelbyville, Ind	2 00
Second, F. N. Smiley, Milligan, Ind	1 00
Buff cock, Chas. E. Bernhart, Irvington, Ind	2 00
Second, Chas. E. Bernhart, Irvington, Ind	1 00
Buff hen, Chas. E. Bernhart, Irvington, Ind	2 00
Second, Chas. E. Bernhart, Irvington, Ind	1 00
Buff cockerel, Chas. E. Bernhart, Irvington, Ind	2 00
Second, Chas. E. Bernhart, Irvington, Ind	1 00
Buff pullet, Chas. E. Bernhart, Irvington, Ind	2 00
Second, W. Lanius, Greensburg, Ind	1 00
Black cock, G. R. Baxter, Hillsdale, Mich	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00
Black hen, B. F. Duncan, Greenfield, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00

Black cockerel, second award, G. R. Baxter, Hillsdale, Mich	\$1 00
Black pullet, G. R. Baxter, Hillsdale, Mich	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00

HOUDAN.

Cock, A. H. Picket, Darlington, Ind	2 00
Second, J. H. Horning, Sunman, Ind	1 00
Hen, Thos. Gregory, Fontanet, Ind	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Cockerel, F. H. Buck, Morristown, Ind	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00
Pullet, F. H. Buck, Morristown, Ind	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00

BLACK SPANISH.

White face cock, H. J. Horning, Sunman, Ind	2 00
Second, G. A. Grasson, 53 Beaty Street, Indianapolis	1 00
White face hen, J. J. Burnside, Milligan, Ind	2 00
Second, J. H. Horning, Sunman, Ind	1 00
White face cockerel, Henry Bloom, Brightwood, Ind	2 00
Second, G. A. Grasson, 53 Beaty Street, Indianapolis	1 00
White face pullet, J. H. Horning, Sunman, Ind	2 00
Second, Chas E. Becker, Mapleton, Ind	1 00

HAMBURG.

Golden cock, G. R. Baxter, Hillsdale, Mich	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Golden hen, A. H. Pickett, Darlington, Ind.	2 00
Second, F. H. Buck, Morristown, Ind.	1 00
Golden cockerel, G. R. Baxter, Hillsdale, Mich	2 00
Golden pullet, G. R. Baxter, Hillsdale, Mich	2 00
Silver cock, R. E. Leonard, Gem, Ind	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00
Silver hen, R. E. Leonard, Gem, Ind.	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Silver cockerel, F. H. Buck, Morristown, Ind	2 00
Second, F. H. Buck, Morristown, Ind	1 00
Silver pullet, F. H. Buck, Morristown, Ind	2 00
Second, R. E. Leonard, Gem, Ind	1 00
Black cock, Thos. Gregory, New Carlisle, Ind.	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00

ANNUAL MEETING.

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Black hen, G. R. Baxter, Hillsdale, Mich.	\$2 00
Second, W. A. Crauer, Fillmore, Ind.	1 00
Black cockerel, J. H. Horning, Sunman, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Black pullet, G. R. Baxter, Hillsdale, Mich.	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00

POLISH.

W. C. B. cock, B. F. Duncan, Greenfield, Ind	2 00
Second, F. H. Buck, Morristown, Ind.	1 00
W. C. B. hen, F. H. Buck, Morristown, Ind	2 00
Second, F. H. Buck, Morristown, Ind	1 00
W. C. B. cockerel, F. H. Buck, Morristown, Ind.	2 00
Second, F. H. Buck, Morristown, Ind.	1 00
W. C. B. pullet, F. H. Buck, Morristown, Ind.	2 00
Second, F. H. Buck, Morristown, Ind.	1 00
Golden hen or pullet, B. F. Duncan, Greenfield, Ind	2 00
Second, F. H. Buck, Morristown, Ind	1 00
Silver cock, F. H. Buck, Morristown, Ind.	2 00
Second, F. H. Buck, Morristown, Ind	1 00
Silver hen, F. H. Buck, Morristown, Ind	2 00
Second, F. H. Buck, Morristown, Ind.	1 00
Silver cockerel, G. R. Baxter, Hillsdale, Mich.	2 00
Silver pullet, G. R. Baxter, Hillsdale, Mich	2 00

MINORCA.

Black cock, A. E. Meredith, corner Broadway and Thirtieth Street, Indianapolis.	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00
Black hen, A. E. Meredith, corner Broadway and Thirtieth Street, Indianapolis.	2 00
Second, Peter Stony, Shelbyville, Ind.	1 00
Black cockerel, Peter Stony, Shelbyville, Ind	2 00
Second, Charles E. Bernhardt, Irvington, Ind	1 00
Black pullet, Peter Stony, Shelbyville, Ind	2 00
Second, Peter Stony, Shelbyville, Ind.	1 00

JAVA.

Black cock or cockerel, Thos. Cory, New Carlisle, Ind	2 00
Second, B. F. Duncan, Greenfield, Ind	1 00
Black hen or pullet, E. B. Murphy, Carmel, Ind.	2 00
Second, E. B. Murphy, Carmel, Ind.	1 00

DORKING

Colored cock or cockerel, G. R. Baxter, Hillsdale, Mich	\$2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Colored hen or pullet, G. R. Baxter, Hillsdale, Mich.	2 00
Second, Thos. Cory, New Carlisle, Ind.	1 00
Silver gray cock or cockerel, G. R. Baxter, Hillsdale, Mich.	2 00
Second, G. R. Baxter, Hillsdale, Mich.	1 00
Silver gray hen or pullet, A. H. Pickett, Darlington, Ind.	2 00
Second, A. H. Pickett, Darlington, Ind.	1 00

RED CAP.

Cock, Thos. Cory, New Carlisle, Ind	2 00
Second, F. H. Buck, Hillsdale, Mich	1 00
Hen, F. H. Buck, Hillsdale, Mich	2 00
Second, Thomas Cory, New Carlisle, Ind	1 00
Cockerel, F. H. Buck, Hillsdale, Mich	2 00
Pullet, Thos. Cory, New Carlisle, Ind.	2 00

BANTAMS—SEABRIGHTS.

Golden cock, I. N. Barker, Thorntown, Ind	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Golden hen, I. N. Barker, Thorntown, Ind	2 00
Second, I. N. Barker, Thorntown, Ind.	1 00
Golden cockerel, I. N. Barker, Thorntown, Ind	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Golden pullet, Thos. Cory, New Carlisle, Ind	2 00
Second, I. N. Barker, Thorntown, Ind.	1 00
Silver Cock, J. H. Horning, Sunman, Ind.	2 00
Second, R. E. Leonard, Gem, Ind.	1 00
Silver hen, A. H. Pickett, Darlington, Ind	2 00
Second, J. H. Horning, Sunman, Ind.	1 00
Japanese cock or cockerel, G. R. Baxter, Hillsdale, Mich	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Japanese hen or pullet, G. R. Baxter, Hillsdale, Mich	2 00
Second, Thos. Cory, New Carlisle, Ind	1 00
Rose combed black cock or cockerel, Thos Cory, New Carlisle, Ind	2 00
Second, W. P. Deckerman, Mallet Creek, Ohio	1 00
Rose combed black hen or pullet, W. P. Deckerman, Mallet Creek, Ohio	2 00
Second, W. P. Deckerman, Mallet Creek, Ohio	1 00

GAME BANTAMS.

Black breasted red cock, H. J. Horning, Sunman, Ind	\$2 00
Second, H. J. Horning, Sunman, Ind	1 00
Black breasted red hen, H. J. Horning, Sunman, Ind	2 00
Second, H. J. Horning, Sunman, Ind	1 00
Black breasted red cockerel, H. J. Horning, Sunman, Ind	2 00
Second, H. J. Horning, Sunman, Ind	1 00
Black breasted red pullet, W. Lanius, Greensburg, Ind	2 00
Second, J. H. Horning, Sunman, Ind	1 00
Silver duckwing cock, S. B. Ferrel, Granbury, Tex	2 00
Second, E. E. Sanders, Kokomo, Ind	1 00
Silver duckwing hen, Peter Stony, Shelbyville, Ind	2 00
Second, W. Lanius, Greensburg, Ind	1 00
Silver duckwing cockerel, B. F. Duncan, Greenfield, Ind	2 00
Second, W. R. Zike & Sons, Morristown, Ind	1 00
Silver duckwing pullet, Peter Stony, Shelbyville, Ind	2 00
Second, Peter Stony, Shelbyville, Ind	1 00
Red pile cock, S. B. Ferrel, Granbury, Tex	2 00
Second, F. R. Hale, Shelbyville, Ind	1 00
Red pile hen, S. B. Ferrel, Granbury, Tex	2 00
Second, F. R. Hale, Shelbyville, Ind	1 00
Red pile cockerel, W. Lanius, Greensburg, Ind	2 00
Second, F. R. Hale, Shelbyville, Ind	1 00
Red pile pullet, Thomas Cory, New Carlisle, Ind	2 00
Second, W. Lanius, Greensburg, Ind	1 00
Brown red cock, F. B. Hale, Shelbyville, Ind	2 00
Second, Thomas Cory, New Carlisle, Ind	1 00
Brown red hen, F. B. Hale, Shelbyville, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Brown red cockerel, F. B. Hale, Shelbyville, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Brown red pullet, G. R. Baxter, Hillsdale, Mich	2 00
Second, J. H. Horning, Sunman, Ind	1 00

BUFF COCHINS—BANTAMS.

Cock, W. R. Zike & Sons, Morristown, Ind	2 00
Second, C. F. Johnson, Rushville, Ind	1 00
Hen, W. R. Zike & Sons, Morristown, Ind	2 00
Second, Clair F. Johnson, Rushville, Ind	1 00
Cockerel, Clair F. Johnson, Rushville, Ind	2 00
Second, W. R. Zike & Sons, Morristown, Ind	1 00
Pullet, Henry Bloom, Brightwood, Ind	2 00
Second, W. R. Zike & Sons, Morristown, Ind	1 00

TURKEYS.

Bronze cock, A. W. Porter, Maywood, Ind	\$2 00
Second, W. A. Crauer, Fillmore, Ind	1 00
Bronze hen, G. R. Baxter, Hillsdale, Mich	2 00
Second, W. A. Crauer, Fillmore, Ind	1 00
Bronze cockerel, W. A. Crauer, Fillmore, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Brown pullet, W. A. Crauer, Fillmore, Ind	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
White Holland cock, Thomas Cory, New Carlisle, Ind	2 00
Second, W. A. Crauer, Fillmore, Ind	1 00
White Holland hen, W. A. Crauer, Fillmore, Ind	2 00
White Holland cockerel, W. A. Crauer, Fillmore, Ind	2 00
Second, W. A. Crauer, Fillmore, Ind	1 00
White Holland pullet, W. A. Crauer, Fillmore, Ind	2 00
Second, W. A. Crauer, Fillmore, Ind	1 00
Buff cock or cockerel, G. R. Baxter, Hillsdale, Mich	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00
Buff hen or pullet, G. R. Baxter, Hillsdale, Mich	2 00
Second, G. R. Baxter, Hillsdale, Mich	1 00

GEESE.

Pair Toulouse, old, J. H. Horning, Sunman, Ind	3 00
Second, Warbert & Bros., Ladoga, Ind	2 00
Pair Toulouse, young, Warbert & Bros., Ladoga, Ind	3 00
Pair Embden, old, J. H. Horning, Sunman, Ind	3 00
Second, G. R. Baxter, Hillsdale, Mich	2 00
Pair Embden, young, Allen Bros., Samong, Ind	3 00
Second, F. N. Smiley, Milligan, Ind	2 00
Pair Chinese, old or young, A. H. Pickett, Darlington, Ind	3 00
Second, G. R. Baxter, Hillsdale, Mich	2 00

DUCKS.

Pair Pekin, J. B. Flathers, Mapleton, Ind	3 00
Second, Allen Bros., Samong, Ind	2 00
Pair Aylesbury, A. H. Pickett, Darlington, Ind	3 00
Second, A. H. Pickett, Darlington, Ind	2 00
Pair Rouen, Allen Bros., Samong, Ind	3 00
Second, Allen Bros., Samong, Ind	2 00
Pair Muscovy, P. H. Walter, North Indianapolis, Ind	2 00

BREEDING PENS.

Consisting of one male and four females.

Light Brahmas, N. E. Woods, Picksburg, Ind	\$4 00
Dark Brahmas, R. E. Leonard, Gem, Ind	4 00
Buff Cochins, C. Matthews & Sons, Manilla, Ind	4 00
Partridge Cochins, W. R. Zike & Sons, Morristown, Ind	4 00
White Cochins, W. O. Swan, Manilla, Ind	4 00
Black Cochins, B. F. Hill, 260 Keystone Avenue, Indianapolis	4 00
Barred Plymouth Rocks, Myers & Hutchinson, Crawfordsville, Ind	4 00
White Plymouth Rocks, R. M. Gard, Frankfort, Ind	4 00
Silver Wyandotte, B. F. Duncan, Greenfield, Ind	4 00
Golden Wyandottes, J. H. Horning, Sunman, Ind	4 00
White Wyandottes, J. H. Horning, Sunman, Ind	4 00
Black Langshan, Myers & Hutchinson, Crawfordsville, Ind	4 00
Red Cap, F. H. Buck, Morristown, Ind	4 00
Black-breasted red games, W. Lanier, Greensburg, Ind	4 00
Indian games, Allen Bros., Samong, Ind	4 00
Brown Leghorns, E. B. Murphy, Carmel, Ind	4 00
White Leghorns, Wm. Tobin, 173 W. Morris Street, Indianapolis	4 00
Black Minorcas, A. E. Meredith, Broadway and Thirtieth streets, Indianapolis, Ind	4 00
Houdans, A. H. Picket, Darlington, Ind	4 00
White Black Spanish, J. H. Horning, Sunman, Ind	4 00
Silver Hamburg, F. H. Buck, Morristown, Ind	4 00
White Crested Black Polish, F. H. Buck, Morristown, Ind	4 00
Silver Polish, F. H. Buck, Morristown, Ind	4 00
Game bantams, J. H. Horning, Sunman, Ind	4 00
Bantams, other than game, C. P. Deckerman, Mallet Creek, O	4 00

DEPARTMENT I.

DAIRY AND CREAMERY PRODUCTS.

C. B. HARRIS, Superintendent.

To the Indiana Delegate State Board of Agriculture:

MR. PRESIDENT—The Department of Dairy and Creamery Products was sufficient to tax the capacity of the building, and the quality excelled any ever exhibited. The expense of this department was \$64.19.

AWARDS.

CLASS XXXV—Dairy and Creamery Products.

30 lbs. tub creamery butter, R. W. Furnas, Indianapolis, Ind	\$20 00
15 lbs. dairy butter, Miss Stella Atwood, Franklin, Ind	20 00
Second award dairy butter, con. prize, Mrs. Mitchell, Princeton, Ind . .	10 00
5 lbs. dairy butter, prints, Jennie McFarland, Southport, Ind	15 00
5 lbs. dairy butter by girl under 20 years, Jennie McFarland, Southport, Ind	15 00
Second, Miss Stella Atwood, Franklin, Ind	10 00
5 lbs. dairy butter by graduate	15 00
Best full cream cheese, A. Schoenman, Plain, Wis	20 00
Second, W. F. Smith, Rensselaer, Ind	10 00

SPECIAL.

Wells & Richardson color, R. W. Furnas, Indianapolis, Ind

DEPARTMENT J.

AGRICULTURE.

JOHN L. DAVIS, Superintendent.

To the Indiana Delegate State Board of Agriculture :

In this department the number of entries in the several classes were as follows :

Class 36—Vegetables	220
Class 37—Root Crops	115
Class 38—Potatoes	194
Class 39—Grain Seeds	300
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Making the total number of entries	829

The expenses were as follows:

Robert Mitchell, Judge Grain Seeds	\$19 25
H. E. Benner, Judge Root Crops	12 00
Allen Robertson, Assistant Superintendent	21 00
J. A. Dinsmore, Assistant Superintendent	12 00
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Total	\$67 25

The exhibits in this department were very fine, and pronounced by competent persons as being equal to, if not surpassing, the exhibit of any former year, and was visited by large numbers daily.

AWARDS

CLASS XXXVI—Vegetables.

Six cauliflowers, Chas. E. Becker, Mapleton, Ind.	\$2 00
Second, D. Ellwanger, Haughville, Ind.	1 00
Six egg plants, Chas. E. Becker, Mapleton, Ind.	2 00
Second, D. Ellwanger, Haughville, Ind.	1 00
Twelve cucumbers, W. D. Whipps & Bros., Marion, O.	2 00
Second, D. Ellwanger, Haughville, Ind.	1 00
Peck white beans, J. W. Roby, Sabine, Ind.	2 00
Second, J. L. Keckley, Marysville, Ind.	1 00
Peck white navy beans, John Marvel, Royalton, Ind.	2 00
Second, John Marvel, Royalton, Ind.	1 00
Peck colored navy beans, W. A. Emis, Clermont, Ind.	2 00
Second, John Marvel, Royalton, Ind.	1 00
Peck lima beans, John Marvel, Royalton, Ind.	2 00
Second, D. Ellwanger, Haughville, Ind.	1 00
Peck field peas, dry, J. L. Keckley, Marysville, O.	2 00
Second, W. D. Whipps & Bros., Marion, O.	1 00
Peck garden peas, dry, J. L. Keckley, Marysville, O.	2 00
Second, W. D. Whipps & Bros., Marion, O.	1 00
Peck peppers for pickling, Chas. E. Becker, Mapleton, Ind.	2 00
Second, E. A. Robinson, Rocklane, Ind.	1 00
Peck tomatoes, Chas. E. Becker, Mapleton, Ind.	2 00
Second, W. D. Whipps & Bros., Marion, O.	1 00
Collection tomatoes, Jno. Marvel, Royalton, Ind.	3 00
Second, Chas. E. Becker, Mapleton, Ind.	2 00
12 ears green sweet corn, W. D. Whipps & Bros., Marion, O.	2 00
Second, J. L. Keckley, Marysville, O.	1 00
Peck dry sweet corn, W. D. Whipps & Bros., Marion, O.	2 00
Second, Jno. Marvel, Royalton, Ind.	1 00
Six Hubbard squashes, W. D. Whipps & Bros., Marion, O.	2 00
Second, Jno. Marvel, Royalton, Ind.	1 00
Six Marblehead squashes, Jno. Marvel, Royalton, Ind.	2 00
Six Crookneck squashes, Jno. Marvel, Royalton, Ind.	2 00
Second, E. A. Robinson, Rocklane, Ind.	1 00
Six California squashes, Jno. Marvel, Royalton, Ind.	2 00
Second, W. D. Whipps & Bros., Marion, O.	1 00
Largest pumpkins, Harry Bennet, Franklin, Ind.	2 00
Second, W. F. Christian, 206 N. Alabama St., Indianapolis, Ind.	1 00
Six field pumpkins, Chas. C. Becker, Mapleton, Ind.	2 00
Second, Jno. Marvel, Royalton, Ind.	1 00
Largest squash, Harry Bennett, Franklin, Ind.	2 00
Second, Jno. Marvel, Royalton, Ind.	1 00

Six Drumhead cabbages, W. D. Whipps & Bros., Marion, O	\$2 00
Second, Jno. Marvel, Royalton, Ind	1 00
Six Flat Dutch cabbages, J. L. Keckley, Marysville, O	2 00
Second, Jno. Marvel, Royalton, Ind	1 00
Six heads cabbage, other kind, Chas. E. Becker, Mapleton, Ind	2 00
Second, D. Ellwanger, Haughville, Ind	1 00
Twelve stalks of celery, Chas. E. Becker, Mapleton, Ind	2 00
Second, Jno. Marvel, Royalton, Ind	1 00
Collection of vegetables, Chas. E. Becker, Mapleton, Ind	10 00
Second, D. Ellwanger, Haughville, Ind	5 00
Six watermelons, D. Ellwanger, Haughville, Ind	3 00
Second, Chas. E. Becker, Mapleton, Ind	2 00
Six nutmeg melons, D. Ellwanger, Haughville, Ind	3 00
Second, Chas. E. Becker, Mapleton, Ind	2 00
Best Gipsy melon, D. Ellwanger, Haughville, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind	1 00
Best Icing melon, D. Ellwanger, Haughville, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind	1 00
Best sweet heart melon, D. Ellwanger, Haughville, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind	1 00
Collection melons, D. Ellwanger, Haughville, Ind	5 00

Henry S. Bonner, Sandusky, Ind., Judge.

CLASS XXXVII—Root Crops.

Peck turnips, Chas. E. Becker, Mapleton, Ind	\$2 00
Second, W. A. Emis, Clermont, Ind	1 00
Peck parsnips, Chas. E. Becker, Mapleton, Ind	2 00
Second, W. A. Eims, Clermont, Ind	1 00
Peck carrots for stock, D. Ellwanger, Haughville, Ind	2 00
Second, John Marvel, Royalton, Ind	1 00
Peck carrots for the table, Chas. E. Becker, Mapleton, Ind	2 00
Second, D. Ellwanger, Haughville, Ind	1 00
Twelve roots salsify, Chas. E. Becker, Mapleton, Ind	2 00
Second, John Marvel, Royalton, Ind	1 00
Twelve horseradish, D. Ellwanger, Haughville, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind	1 00
Twelve long red beets, Harry Bennett, Franklin, Ind	2 00
Second, E. A. Robinson, Rocklane, Ind	1 00
Twelve turnip beets, D. Ellwanger, Haughville, Ind	2 00
Second, John Marvel, Royalton, Ind	1 00
Twelve sugar beets, John Marvel, Royalton, Ind	2 00
Second, E. H. Robinson, Rocklane, Ind	1 00
Twelve mangle beets, S. Johnson, Central avenue, Irvington, Ind	2 00
Second, W. F. Christian	1 00

Peck red onions, W. D. Whipp & Bros., Marion, Ohio	\$2 00
Second, J. L. Keckley, Marysville, Ind	1 00
Peck yellow onions, W. D. Whipp & Bros., Marion, Ohio.	2 00
Second, W. D. Whipp & Bros., Marion, Ohio	1 00
Peck white onions, W. D. Whipp & Bros., Marion, Ohio	2 00
Second, W. D. Whipp & Bros., Marion, Ohio	1 00
Twelve turnip radishes, John Marvel, Royalton, Ind	1 00
Second, John Marvel, Royalton, Ind	50
Twelve long radishes, Chas. E. Becker, Mapleton, Ind	1 00
Second, John Marvel, Mapleton, Ind	50
Collection crops, Chas. E. Becker, Mapleton, Ind	5 00
Second, D. Ellwanger, Haughville, Ind	3 00
Gallon white onion sets, D. Ellwanger, Haughville, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind.	1 00
Gallon yellow onion sets, W. A. Emis, Clermont, Ind	2 00
Second, E. A. Robinson, Rocklane, Ind	1 00

Henry S. Bonner, Sandusky, Ind., Judge.

CLASS XXXVIII—Potatoes.

Peck White Star, W. A. Emis, Clermont, Ind	\$2 00
Second, J. L. Keckley, Marysville, Ohio.	1 00
Peck Dunmore Seedling, W. D. Whipp & Bros., Marion, Ohio	2 00
Second, J. L. Keckley, Marysville, Ohio	1 00
Peck Early Rose, J. L. Keckley, Marysville, Ohio	2 00
Second, F. M. Sanford, Philadelphia, Ind	1 00
Peck Snowflake, D. F. Corwin, Springboro, Ohio	2 00
Second, W. D. Whipp & Bros., Marion, Ohio	1 00
Peck Early Ohio, W. O. Swan, Manilla, Ind.	2 00
Second, W. D. Whipp & Bros., Marion, Ohio	1 00
Peck Early Vermont, J. L. Keckley, Marysville, Ohio	2 00
Second, W. D. Whipp & Bros., Marion, Ohio	1 00
Peck Beauty of Hebron, W. O. Swan, Manilla, Ind	2 00
Second, W. D. Whipp & Bros., Marion, O	1 00
Peck Clarks No. 1, W. D. Whipp & Bros., Marion, O	2 00
Second, J. L. Keckley, Marysville, O.	1 00
Peck Burbank Seedling, W. D. Whipp & Bros., Marion, O.	2 00
Second, Harry Bennett, Franklin, Ind	1 00
Peck Early Sunrise, J. L. Keckley, Marysville, O	2 00
Second, W. A. Emis, Clermont, Ind	1 00
Peck Green Mountain, D. F. Corwin, Springboro, O	2 00
Second, J. L. Keckley, Marysville, O.	1 00
Peck Bliss Triumphs, W. O. Swan, Manilla, Ind.	2 00
Second, W. O. Swan, Manilla, Ind	1 00
Peck Pride of America, W. D. Whipp & Bros., Marion, O.	2 00

Second, J. L. Keckley, Marysville, O.	\$1 00
Peck Early Bell, W. O. Swan, Manilla, Ind.	2 00
Second, Jno. L. Keckley, Marysville, O.	1 00
Peck Freeman, W. D. Whipps & Bros., Marion, O.	2 00
Second, J. L. Keckley, Marysville, O.	1 00
Peck Everett's Early Six Weeks Market, W. O. Swan, Manilla, Ind . . .	2 00
Second, J. L. Keckley, Marysville, O.	1 00
Peck Rural New Yorker, N. E. Woods, Peckbury, Ind	2 00
Second, W. O. Swan, Manilla, Ind	1 00
Peck Onward, J. L. Keckley, Marysville, O.	2 00
Second, W. D. Whipps & Bros., Marion, O	1 00
Peck Maggie Murphy, W. O. Swan, Manilla, Ind	2 00
Second, W. D. Whipps & Bros., Marion, O	1 00
Peck Early Harvest, W. D. Whipps & Bros., Marion, O	2 00
Second, J. L. Keckley, Marysville, O.	1 00
Peck Chas. Downing, F. M. Sanford, Philadelphia, Ind.	2 00
Second, D. F. Corwin, Springboro, O	1 00
Peck any other variety, J. L. Keckley, Marysville, O	2 00
Second, Jno. Marvel, Royalton, Ind	1 00
Collection Irish, not less than ten varieties, J. L. Keckley, Marysville, O.	10 00
Second, W. D. Whipps & Bros., Marion, O	5 00
Peck yellow sweet, W. A. Emis, Clermont, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind	1 00
Peck red sweet, E. A. Robinson, Rocklane, Ind	2 00
Second, Chas. E. Becker, Mapleton, Ind	1 00
Collection sweet potatoes, five or more varieties, W. D. Whipps & Bros., Marion, O.	5 00
Second, D. Ellwanger, Haughville, Ind.	3 00

Henry S. Bonner, Sandusky, Ind., Judge.

CLASS XXXIX—Grain and Seeds.

Twenty ears yellow corn, Harry Bennet, Franklin, Ind.	\$5 00
Second, E. A. Robinson, Rocklane, Ind	2 00
Twenty ears white corn, F. M. Sanford, Philadelphia, Ind	5 00
Second, E. A. Robinson, Rocklane, Ind	2 00
Twenty ears corn, other color, E. A. Robinson, Rocklane, Ind.	5 00
Second, E. A. Robinson, Rocklane, Ind	2 00
Twenty ears hominy corn, J. L. Keckley, Marysville, Ohio	5 00
Second, W. D. Whipp & Bros., Marion, Ohio	2 00
Twenty ears white pop corn, John Marvel, Royalton, Ind	2 00
Second, W. D. Whipp & Bros, Marion, Ohio	1 00
Twenty ears red pop corn, W. D. Whipp & Bros., Marion, Ohio	2 00
Second, John Marvel, Royalton, Ind	1 00
Twenty ears, any color, J. H. Keckley, Marysville, Ind	2 00

Second, John Marvel, Royalton, Ind	\$1 00
Display corn, L. B. Clove, Franklin, Ind	20 00
Second, E. A. Robinson, Rocklane, Ind	10 00
Half bushel white wheat, W. D. Whipp & Bros., Marion, Ohio	5 00
Second, W. D. Whipp & Bros., Marion, Ohio	2 00
Half bushel red wheat, D. F. Corwin, Springboro, Ohio	5 00
Second, B. Dennie, Franklin, Ind	2 00
Half bushel amber wheat, K. L. Ketchley, Marysville, Ind	5 00
Second, C. G. Robinson, Mason, Mich	2 00
Display wheat, John Marvel, Royalton, Ind.	10 00
Second, J. L. Keckley, Marysville, Ohio	5 00
Display grain and straw, J. L. Keckley, Marysville, Ohio	5 00
Second, John Marvel, Royalton, Ind	2 00
Half bushel rye, J. L. Keckley, Royalton, Ind	2 00
Second, J. L. Keckley, Royalton, Ind	1 00
Half bushel white oats, J. L. Keckley, Royalton, Ind	2 00
Second, W. D. Whipps & Bros., Marion, Ohio.	1 00
Half bushel mixed oats, W. D. Whipps & Bros, Marion, Ohio	2 00
Second, F. M. Sanford, Philadelphia, Ind.	1 00
Half bushel buckwheat, Jno. Marvel, Royalton, Ind	2 00
Second, W. D. Whipps & Bros., Marion, Ohio.	1 00
Half bushel barley, J. L. Keckley, Marysville, Ind	2 00
Second, J. L. Keckley, Marysville, Ind.	1 00
Half bushel flax seed, D. F. Corwin, Springboro, Ohio.	2 00
Second, W. D. Whipps & Bros., Marion, Ohio	1 00
Half bushel millet seed, W. D. Whipps & Bros., Marion, Ohio	2 00
Second, D. F. Corwin, Springboro, Ohio	1 00
Half bushel timothy seed, J. L. Keckley, Marysville, Ohio	2 00
Second, Jno. Marvel, Royalton, Ind	1 00
Half bushel orchard grass, W. D. Whipps & Bros., Marion, Ohio	2 00
Second, J. L. Keckley, Marysville, Ohio	1 00
Half bushel Hungarian grass seed, J. L. Keckley, Marysville, Ohio	2 00
Second, W. D. Whipps & Bros., Marion, Ohio.	1 00
Half bushel Kentucky blue grass seed, Jno. Marvel, Royalton, Ind	2 00
Second, J. L. Keckley, Marysville, Ohio	1 00
Half bushel England blue grass seed, W. D. Whipps & Bros., Marion, Ohio	2 00
Second, W. A. Emis, Clermont, Ind	1 00
Half bushel lawn grass seed, J. L. Keckley, Marysville, Ohio.	2 00
Second, W. D. Whipps & Bros., Marion, Ohio.	1 00
Half bushel red clover seed, W. D. Whipps & Bros., Marion, Ohio	2 00
Second, D. F. Corwin, Springboro, Ohio	1 00
Half bushel English clover seed, W. D. Whipps & Bros., Marion, Ohio	2 00
Second, Jno. Marvel, Royalton, Ind	1 00
Sample ten lbs. broom corn, W. A. Emis, Clermont, Ind	2 00

Second, Jno. Marvel, Royalton, Ind	\$1 00
Collection of grain seeds, J. L. Keckley, Marysville Ohio	10 00
Second, Jno. Marvel, Royalton, Ind	5 00
Collection farm products, E. A. Robinson, Rocklane, Ind	50 00
Second, Jno. Marvel, Royalton, Ind	25 00

Robt. Mitchell, Princeton, Ind., Judge.

DEPARTMENT K.

HORTICULTURAL.

JAS. E. McDONALD, Superintendent.

To the President and Members of the State Board of Agriculture:

The Horticultural Department was one of the most interesting and best fitted shows made during the exhibition of 1896. The fruit display was not so large as in 1895, the number of entries not reaching the aggregate of that successful and general growing of a large fruit crop, but that shown was of a character and quality never before excelled in the State. The displays made by the counties and various horticultural societies added much to the interest of the contest for prizes, and the organizations making the display are all to be congratulated upon the excellence of the products, as well as the most attractive manner of the show.

In the Floral Department the show was of superior excellence and of marked interest to the many visitors. The competition was strong in many of the classes, and shows a growing interest in this part of the competition. This was especially noted in the professional division. I would recommend, however, that a radical change be made in the classification and arrangement of the amateur list.

The Bee and Honey Department was much more complete in its display, the competitors coming from four States, the several exhibits being most creditable and attractive.

I will reiterate what I said in my report of 1895 regarding the attitude of the Indiana Horticultural Society and its officers toward this department of the State Fair, and express the hope that the friendly relations now existing be maintained and encouraged.

The total expense of this department for judges, helpers, etc., for 1896 was \$82.

AWARDS.

CLASS XL—Fruits.

COLLECTIONS FRUITS.

Fifteen varieties for home use, John Reed, Glenwood, Ind	\$10 00
Second, D. F. Corwin, Springboro, O	6 00
Ten varieties for market, John Reed, Glenwood, Ind.	8 60
Second, Mrs J. Sanders & Son.	5 00
Five varieties for culinary purposes, D. F. Corwin, Springboro, O	4 00
Second, N. E. Woods, Peckbury, Ind.	2 00
Plate Maiden Blush, W. B. Flick, Lawrence, Ind	1 00
Second, Robinson & Sanders, Franklin, Ind.	50
Plate Smith Cider, John Reed, Glenwood, Ind	1 00
Second, N. E. Woods, Peckbury, Ind.	50
Plate Ben Davis, J. A. Burton, Orleans, Ind	1 00
Second, John Reed, Glenwood, Ind	50
Plate Rome Beauty, J. A. Burton, Orleans, Ind	1 00
Second, John Reed, Glenwood, Ind.	50
Plate Wine Sap, Riley Sanders, Bloomington, Ind.	1 00
Second, John Reed, Glenwood, Ind	50
Plate Rambo, L. F. Hess, Martinsville, Ind.	1 00
Second, W. B. Flick, Lawrence, Ind	50
Plate Yellow Bellflower, John Reed, Glenwood, Ind.	1 00
Second, Riley Sanders, Bloomington, Ind.	50
Plate Tulpehocken, W. D. Whipps & Bros., Marion, O.	1 00
Second, W. D. Whipps & Bros., Marion, O	50
Plate Fall Pippin, D. F. Corwin, Springboro, O	1 00
Second, St. Joseph Co., South Bend, Ind	50
Plate Willow Twig, W. B. Flick, Lawrence, Ind.	1 00
Second, John Reed, Glenwood, Ind	50
Plate Newton Spitzenburg, John Reed, Glenwood, Ind.	1 00
Second, W. B. Flick, Lawrence, Ind	50
Plate Westfield Seeknofurther, John Reed, Glenwood, Ind	1 00
Second, D. F. Corwin, Springboro, O	50
Plate Wagner, D. F. Corwin, Springboro, O.	1 00
Plate Tamense or Snow, John Reed, Glenwood, Ind	1 00
Second, Riley Sanders, Bloomington, Ind.	50
Plate Moore Sweet	
Second, J. H. Thomas, Lawrence, Ind	50
Plate Tompkins' King, W. D. Whipps & Bros., Marion, O	1 00
Second, John Reed, Glenwood, Ind	50
Plate Hubbardston, D. F. Corwin, Springboro, O	1 00
Second, John Reed, Glenwood, Ind	50

Plate Peek Pleasant, D. F. Corwin, Springboro, O.	\$1 00
Plate Rhode Island Greening, Jno. Daubenspeck, Mattsville, Ind	1 00
Second, Robinson Sanders, Franklin, Ind.	50
Plate Clinton, J. O. Vennice, Danville, Ind.	1 00
Second, W. B. Flick, Lawrence, Ind	50
Plate White Pippin, Mrs. J. Sanders & Son, Westfield, Ind.	1 00
Second, Mrs. J. Sanders & Son, Westfield, Ind.	50
Plate White Baldwin, W. D. Whipp & Bros., Marion, O.	1 00
Plate York Imperial, Wm. Mustard, Ripple, Ind	1 00
Plate Northern Spy, Jno. Reed, Glenwood, Ind	1 00
Second, L. F. Hess, Martinsville, Ind.	50
Grimes Golden, R. Sanders, Bloomington, Ind	1 00
Second, Mrs. J. Sanders & Son, Westfield, Ind.	50
Plate Roman Stem, Jno. Reed, Glenwood, Ind.	1 00
Second, Wm. Mustard, Ripple, Ind.	50
Plate Indian Favorite, Mrs. J. Sanders & Son, Westfield, Ind.	1 00
Second, Jno. Reed, Glenwood, Ind	50
Plate Belmont, D. F. Corwin, Springboro, O	1 00
Plate Johnathan, W. B. Flick, Lawrence, Ind.	1 00
Second, Riley Sanders, Bloomington, Ind.	50
Plate Lansingburg, Jno. Reed, Glenwood, Ind	1 00
Plate Talman Sweet, L. F. Hess, Martinsville, Ind.	1 00
Second, St. Joseph County, South Bend, Ind	50
Plate Vandever, J. O. Vennice, Danville, Ind	1 00
Second, W. B. Flick, Lawrence, Ind	50
Plate Twenty Ounce, D. F. Corwin, Springboro, O.	1 00
Second, Jno. Morgan, Plainfield, Ind.	50
Plate Wealthy, D. F. Corwin, Springboro, O	1 00
Second, J. W. Thomas, Lawrence, Ind	50
Plate Stark, Jno. Reed, Glenwood, Ind	1 00
Second, D. F. Corwin, Springboro, O	50
Plate Pewaukee, Riley Sanders, Bloomington, Ind.	1 00
Second, H. F. Clapp, Scipio, Ind.	50
Plate Roxbury Russett, Jno. Daubenspeck, Mattsville, Ind.	1 00
Second, J. W. Thomas, Lawrence, Ind	50
Plate England Golden Russet, D. F. Corwin, Springboro, O.	1 00
Plate Hyslopp, Mary J. Flick, Lawrence, Ind.	1 00

COLLECTION PEARS.

Eight varieties for market, Jno. Reed, Glenwood, Ind	1 00
Second, W. B. Flick, Lawrence, Ind	50

SINGLE PLATES.

Plate Bartlett, W. C. Flick, Lawrence, Ind	\$1 00
Second, C. A. Saltmarsh, Seymour, Ind	50
Plate Anjou, Jno. Reed, Glenwood, Ind.	1 00
Second, Mrs. J. Sanders, Westfield, Ind.	50
Angoulenne (Dutchess), W. B. Flick, Lawrence, Ind.	1 00
Second, Jno. Daubenspeck, Mattsville, Ind	50
Plate Flemish Beauty, W. B. Flick, Lawrence, Ind	1 00
Plate Kieffer, Jas. M. Johnson, Mallott Park	1 00
Second, Jno. Daubenspeck, Mattsville, Ind	50
Plate Louise Bon, Wm. Mustard, Ripple, Ind.	1 00
Plate Lawrence, Wm. Mustard, Ripple, Ind.	1 00
Plate Winter Nelis, Wm. Mustard, Ripple, Ind	1 00
Plate Vicar, Wm. Mustard, Ripple, Ind	1 00
Second, Mrs. J. Sanders, Westfield, Ind	50

COLLECTION OF PEACHES.

Six varieties for any purpose, John Reed, Glenwood, Ind	6 00
Second, Mary J. Flick, Lawrence, Ind	3 00
Three varieties for market, John Reed, Glenwood, Ind	3 00
Second, Mary J. Flick, Lawrence, Ind	1 50

SINGLE PLATES.

Plate Clings, John Reed, Glenwood, Ind	1 00
Second, Ethel Thomas, Lawrence, Ind	50
Plate Free Stones, Ella M. Ingraham, 86 N. Capitol Ave., Indianapolis	1 00
Second, John Reed, Glenwood, Ind	50

COLLECTION OF QUINCES.

Best collection, Mary J. Flick, Lawrence, Ind	3 00
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SINGLE PLATES

Plate Orange Quince, Mary J. Flick, Lawrence, Ind	1 00
Plate Champion, John Reed, Glenwood, Ind	1 00
Second, J. H. Thomas, Lawrence, Ind	50
Plate Missouri Mammoth, Wm. Mustard, Ripple, Ind	1 00
Second, Mary J. Flick, Lawrence, Ind	50

PLATE OF PLUMS.

Plate plums, John Daubenspeck, Mattsville, Ind	1 00
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COLLECTION OF GRAPES.

Ten varieties for family use, S. Johnson, Central Ave., Irvington, Ind . .	\$5 00
Second, C. A. Saltmarsh, Seymour, Ind	2 50
Six varieties for market, S. Johnson, Central Ave., Irvington, Ind . . .	3 00
Second, C. A. Saltmarsh, Seymour, Ind	1 50
Five clusters, any kind, C. A. Saltmarsh, Seymour, Ind	2 00
Second, C. A. Saltmarsh, Seymour, Ind	1 00

SINGLE PLATES.

Plate Norden, C. A. Saltmarsh, Seymour, Ind	75
Second, Mrs. T. M. Saltmarsh, Sunman, Ind	50
Plate Concord, S. Johnson, Central Ave., Irvington, Ind	75
Second, C. A. Saltmarsh, Seymour, Ind	50
Plate Wilder, S. Johnson, Central Ave., Irvington, Ind	75
Plate Duchess, S. Johnson, Central Ave., Irvington, Ind	75
Second, C. A. Saltmarsh, Seymour, Ind	50
Plate Brighton, S. Johnson, Central Ave., Irvington, Ind	75
Second, C. A. Saltmarsh, Seymour, Ind	50
Plate Pocklington, S. Johnson, Irvington, Ind	75
Second, C. A. Saltmarsh, Seymour, Ind	50
Plate Niagara, S. Johnson, Irvington, Ind	75
Second C. A. Saltmarsh, Seymour, Ind	50
Plate Moores Diamond	
Plate Vergennes, S. Johnson, Irvington, Ind	75
Second, C. A. Saltmarsh, Seymour, Ind	50
Plate hothouse grapes, S. Johnson, Irvington, Ind	1 00
Plate seedlings, S. Johnson, Irvington, Ind	75
Plate persimmons, Robinson & Sanders, Franklin, Ind.	1 00
Second, E. R. Henley, Westfield, Ind.	50
Plate pawpaws, J. Reed, Glenwood, Ind	1 00
Second, Robinson & Sanders, Franklin, Ind	50
Best and most artistic display fruits, flowers, grasses and vegetables, etc., Fred. Dickson, Lawrence, Ind	16 00
Second, Roy Hindman, Lawrence, Ind	12 00
Third, Irwin Bertermann Indianapolis, Ind.	8 00

W. H. Ragan, Greencastle, Ind., Judge.

CLASS XLI—Flowers, Professional

Best twelve palms, A. Wiegand & Son, Indianapolis, Ind	\$10 00
Second, Bertermann Bros., Indianapolis, Ind	8 00
Best twelve Cal. and alocacies, A. Wiegand & Son, Indianapolis, Ind . .	10 00
Second, Bertermann Bros., Indianapolis, Ind	7 00
Best twenty-five ferns and lycopodium, Bertermann Bros., Indianapolis, Ind.	10 00
Second, A. Wiegand & Son, Indianapolis, Ind.	7 00

ANNUAL MEETING.

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Best twelve blooming begonias, A. Wiegand & Son, Indianapolis, Ind . .	\$7 00
Best twelve foliage begonias, Bertermann Bros., Indianapolis, Ind. . .	7 00
Second, A. Wiegand & Son, Indianapolis, Ind.	4 00
Best twelve cannas, Chas. O. Wheatcraft, 1541 Capital Ave. Indianapolis, Ind.	10 00
Second, Bertermann Bros., Indianapolis, Ind	7 00
Best twenty-five var. show plants, A. Wiegand & Son, Indianapolis, Ind .	10 00
Second, Bertermann Bros. Indianapolis, Ind	7 00
Best twelve asters, A. Wiegand, Indianapolis, Ind.	5 00
Second, Chas O. Wheatcraft, Indianapolis, Ind	3 00
Best twelve double geraniums, Chas. O. Wheatcraft, Indianapolis, Ind. .	6 00
Second, Bertermann Bros., Indianapolis, Ind	4 00
Best twelve coleus, Bertermann Bros., Indianapolis, Ind	6 00
Second, A. Wiegand & Son, Indianapolis, Ind.	4 00
Best two vases, A. Wiegand & Son, Indianapolis, Ind	10 00
Second, Chas. O. Wheatcraft, Indianapolis, Ind	7 00
Second best three hanging baskets, Chas. O. Wheatcraft, Indianapolis, Ind.	3 00

SPECIAL.

Best display of plants, A. Wiegand, Indianapolis, Ind	\$50 00
Second, Bertermann Bros., Indianapolis, Ind	35 00

FIRST FLORAL DAY.

Best two funeral designs, Bertermann Bros., Indianapolis, Ind	\$25 00
Second, J. A. Reiman, 3 Massachusetts Avenue, Indianapolis, Ind . . .	15 00
Best three baskets, Bertermann Bros., Indianapolis, Ind	20 00
Second, J. A. Rieman, Indianapolis, Ind	15 00
Best five bouquets, Bertermann Bros., Indianapolis, Ind	10 00
Second, J. A. Rieman, Indianapolis, Ind	7 00
Collection cut roses, W. W. Coles, Kokomo, Ind.	10 00
Second, Bertermann & Bros., Indianapolis, Ind	7 00
Collection cut flowers, Bertermann Bros., Indianapolis, Ind	15 00
Second, W. W. Cole, Kokomo, Ind	10 00
Collection of cannas, W. W. Cole, Kokomo, Ind	10 00
Second, Bertermann Bros., Indianapolis, Ind	6 00
Collection cut gladiolas, Bertermann Bros., Indianapolis, Ind	15 00
Best and most original design, Bertermann Bros., Indianapolis, Ind . . .	50 00
Second, John A. Rieman, Indianapolis, Ind	35 00
Best and most original funeral design, Bertermann Bros., Indianapolis, Ind.	50 00
Second, John A. Rieman, Indianapolis, Ind	35 00

Peter Reese, South Bend, Ind., Judge.

CLASS XLII—Flowers, Amateur.

Best collection begonias, E. R. Henley, Westfield, Ind	\$5 00
Second, Mrs. James Deathe, Indianapolis, Ind	3 00
Best collection asters in bloom, E. R. Henley, Westfield, Ind	4 00
Best six tube roses, I. N. Barker, Thorntown, Ind	4 00
Best collection carnations in pots, Miss Clara Smith, Indianapolis, Ind	4 00
Best three hanging baskets, E. R. Henley, Westfield, Ind	3 00
Best general collection plants, E. R. Henley, Westfield, Ind	9 00

CUT FLOWERS.

Best collection geraniums, Mrs. E. F. Akass, Indianapolis, Ind	3 00
Second, Mrs. P. D. Stagg, Greensburg, Ind	2 00
Best collection roses, Mrs. P. D. Stagg, Greensburg, Ind	4 00
Second, J. Moesch, North Indianapolis, Ind	2 00
Best collection verbenas, Mrs. Chas. Estebrook, 634 E. Marlowe, Indianapolis, Ind	3 00
Second, Miss Clara Hosbrook, 142 Hosbrook Street, Indianapolis, Ind	2 00
Best collection dahlias, Miss Clara Hosbrook, 142 Hosbrook Street, Indianapolis, Ind	3 00
Second, J. Moesch, Indianapolis, Ind	2 00
Best collection gladiolas, Miss Clara Smith, Indianapolis, Ind	3 00
Second, Mrs. P. D. Stagg, Greensburg, Ind	2 00
Best design cut flowers, Miss Clara Smith, Indianapolis, Ind	8 00
Second, Mrs. Chas. Estabrook, Indianapolis, Ind	4 00
Best twelve carnations, J. Moesch, North Indianapolis, Ind	3 00
Second, Miss Clara Smith, Indianapolis, Ind	2 00
Best two bouquets, flat, Miss Clara Smith, Indianapolis, Ind	4 00
Second, J. Moesch, North Indianapolis, Ind	2 00

Peter Reese, South Bend, Ind., Judge.

DEPARTMENT K.

HORTICULTURAL.

JAS. E. McDONALD, Superintendent.

CLASS XLIII—Bees and Honey.

Comb honey, G. H. Kirkpatrick, Union City, Ind	\$13 00
Second, W. Z. Hutchinson, 613 Wood Street, Flint, Mich	6 00
Extracted honey, E. Hutchinson, Vassar, Mich	13 00
Second, W. Z. Hutchinson, Flint, Mich.	6 00

Beeswax, not less than twenty pounds, G. H. Kirkpatrick, Union City, Ind	\$7 00
Second, E. Hutchinson, Vassar, Mich	3 00
Italian bees, one frame, E. Hutchinson, Vassar, Mich	5 00
Second, J. F. Michael, Greenville, O	3 00
Italian queen bee, W. Z. Hutchinson, Flint, Mich	5 00
Second, J. F. Michael, Greenville, Ohio	3 00
Honey vinegar, one gallon, E. Hutchinson, Vassar, Mich	2 00
Second, J. Moesch, North Indianapolis, Ind	1 00
Honey plants, W. Z. Hutchinson, Flint, Mich	10 00
Second, Mrs. A. G. Selman, 680 E. Washington Street, Indianapolis, Ind.	5 00
Aparian supplies, C. B. Clove, Franklin, Ind	15 00
Second, E. Hutchinson, Vassar, Mich	8 00
Comb foundations for brood chamber, W. Z. Hutchinson, Flint, Mich. .	2 00
Second, G. H. Kirkpatrick, Union City, Ind	1 00
Comb foundations, for surplus honey, G. H. Kirkpatrick, Union City, Ind	2 00
Second, W. Z. Hutchinson, Flint, Mich.	1 00
Honey extractor, G. H. Kirkpatrick, Union City, Ind	3 00
Second, W. Z. Hutchinson, Flint, Mich.	2 00
Wax extractor, W. Z. Hutchinson, Flint, Mich	3 00
Second, G. H. Kirkpatrick, Union City, Ind	2 00
Bee hive for comb honey, H. G. Kirkpatrick, Union City, Ind	3 00
Second, J. Moesch, North Indianapolis, Ind.	2 00
Bee hive for extracted honey, W. Z. Hutchinson, Flint, Mich.	3 00
Second, J. Moesch, North Indianapolis, Ind.	2 00
Shipping orate, G. H. Kirkpatrick, Union City, Ind	2 00
Second, G. H. Kirkpatrick, Union City, Ind	1 00
Uncapping knife, W. Z. Hutchinson, Flint, Mich	1 00
Second, J. Moesch, North Indianapolis, Ind.	50
Smoker, J. Moesch, North Indianapolis, Ind	1 00
Second, W. Z. Hutchinson, Flint, Mich	50

Alonzo Tyner, Greenfield, Ind., Judge.

DEPARTMENT L.

ART.

CHARLES DOWNING, Superintendent.

To the President and Members of the Delegate Board of the Indiana State Board of Agriculture:

GENTLEMEN—I beg to submit the following report as Superintendent of the Fine Art Department:

The exhibit in this department was unusually large, the largest ever known in the history of the Fair, as I have been informed by the older members of the Board.

The quality of the exhibit was better than the average State Fair generally attracts.

I would recommend the elimination of several useless articles from the list when the committee revises the same.

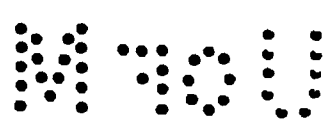
The expense of Department Superintendents was \$243.65.

The following is a complete list of awards made in this department.

AWARDS.

CLASS XLIV—Old Ladies' Department.

Silk quilt, Mrs. F. H. Hinsey, Pekin, Ill	\$2 00
Second, Mrs. J. Liebhardt, Knightstown, Ind	1 00
Worsted quilt, Mrs. A. J. Jackson, Bennington, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Quilt outline, M. S. Maggaman	1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Rug, Laura Bahr, Huntington, Ind	1 50
Second, Miss Anna Miller, Quincy, Ill	1 00
Spread, knit, Mrs. F. G. Hinsey, Pekin, Ill	2 00
Second, Mrs. F. G. Hinsey, Pekin, Ill	1 00
Spread, crochet, Mrs J. P. Smith, Indianapolis, Ind	1 50
Second, Mrs. C. Luche, Palmyra, Mo	1 00
Pair silk mittens, Mrs. F. G. Hinsey, Pekin, Ill	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind	1 00
Pair silk stockings, Mrs. C. C. Burns, Greensburg, Ind	1 50
Second, Mrs. E. Buck, Lockland, O	1 00
Pair silk socks, Mrs. F. G. Hinsey, Pekin, Ill	1 50



Second, Mrs. C. C. Burns, Greensburg, Ind	\$1 00
Pair woolen stockings, Mrs. R. D. Stagg, Greensburg, Ind	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind	1 00
Pair woolen socks, Mrs. R. D. Stagg, Greensburg, Ind	1 50
Second, Mrs. C. C. Burns, Greensburg, Ind	1 00
Pair worsted mittens, Mrs. R. D. Stagg, Greensburg, Ind	1 00
Hemstitching, Mrs. C. C. Burns, Greensburg, Ind	1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Drawn work, Mrs. C. Dille, Greensburg, Ind	1 50
Second, Mrs. W. F. Jenkins, Indianapolis, Ind	1 00
Table cover, Mrs. W. F. Jenkins, Indianapolis, Ind	1 50
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Table scarf, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Embroidery cotton, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind	1 00
Embroidery silk specimen, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. A. D. Rogers, Indianapolis, Ind	1 00
Embroidery worsted specimen, Mrs. C. C. Burns, Greensburg, Ind	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind	1 00
Embroidery tray cloth, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. A. J. Jackson, Bennington, Ind	1 00
Crochet slippers, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Couch cover, Mrs. J. Liebhardt, Knightstown, Ind	1 50
Second, Mrs. C. C. Burns, Greensburg, Ind	1 00
Reticule, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Second, Mrs. F. G. Hinsey, Pekin, Ill	50

Mrs. J. E. Howe, Judge.

CLASS XLV—Knitting and Crochet.

Infant's shirt, Laura Bahr, Huntington, Ind	\$1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Infants' socks display, Mrs. G. A. McLeod, Cincinnati, O	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind	50
Pair silk mittens, Mrs. A. G. Jackson, Bennington, Ind	1 50
Second, Laura Bahr, Huntington, Ind	1 00
Pair woolen mittens, Margaret Jackson, Palmyra, Mo	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Crochet tidy, cotton, Mrs. E. F. Beck, Quincy, Ill	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Pair silk stockings, Mrs. C. C. Burns, Greensburg, Ind	2 00
Second, Mrs. L. Beckwith, Mitchell, S. Dakota	1 00
Pair woolen stockings, Margaret Jackson, Palmyra, Mo	1 50

Second, Mrs. R. D. Stagg, Greensburg, Ind	\$1 00
Infant's crochet sack, Mrs. Charles Nye, Indianapolis, Ind	1 50
Second, Alice Cline, Crawfordsville, Ind	1 00
Infant's knit sack, Mrs. G. A. McLeod, Cincinnati, O	1 50
Crochet shawl, ice wool, Miss Anna Miller, Quincy, Ill	2 00
Second, Mrs. A. G. Jackson, Bennington, Ind	1 00
Couch cover, Mrs. A. Sammons, Michigan City, Ind	2 00
Second, Miss Anna Miller, Quincy, Ill	1 00
Fancy crochet, Mrs. J. P. Smith, Indianapolis, Ind	1 50
Second, Mrs. A. G. Jackson, Bennington, Ind	1 00
Afghan, infant's, Mrs. J. Liebhart, Knightstown, Ind	1 50
Second, Mrs. E. F. Akass, Indianapolis, Ind	1 00
Afghan, infant's, Miss Anna Miller, Quincy, Ill	2 00
Second, Mrs. A. G. Jackson, Bennington, Ind	1 00
Crochet skirt, Miss Anna Miller, Quincy, Ill	1 50
Second, Miss Maud Hinsey, Quincy, Ill	1 00
Child's crochet skirt, Miss Anna Miller, Quincy, Ill	1 50
Second, Mrs. George Sands, Kokomo, Ind	1 00
Crochet slippers, Meta Baker, Peoria, Ill	1 50
Second, Laura Bahr, Huntington, Ind	1 00
Knit slippers, Margaret Jackson, Palmyra, Mo	1 50
Second, Mrs. A. Berryman, Tipton, Ind	1 00
Crochet tidy, silk, Mrs. R. D. Stagg, Greensburg, Ind	2 00
Second, Margaret Jackson, Palmyra, Mo	1 00
Silk purse, Mrs. C. C. Burns, Greensburg, Ind	1 50
Second, Mrs. Wm. Welch, Indianapolis, Ind	1 00
Crochet cape, Mrs. A. G. Jackson, Bennington, Ind	2 00
Second, Mrs. J. Liebhardt, Knightstown, Ind	1 00

Maggie C. Steele, Greenfield, Ind., Judge.

CLASS XLVI—Lace Work.

Point lace display, Mrs. A. Berryman, Tipton, Ind	\$1 50
Second, Mrs. A. G. Jackson, Bennington, Ind	1 00
Point lace, specimen, Miss Maud Hinsey, Pekin, Ill	2 00
Second, Ida Craft, Indianapolis, Ind	1 00
Point lace handkerchief, Mrs. W. L. Hunter, Rising Sun, Ind	2 00
Second, Mrs. A. Berryman, Tipton, Ind	1 00
Tatting, specimen, Adella Sloan, Indianapolis, Ind	1 50
Second, Mrs. E. F. Beck, Quincy, Ill	1 00
Novelty braid display, Mrs. G. A. McLeod, Cincinnati, O	1 50
Second, Mrs. A. G. Jackson, Bennington, Ind	1 00
Silk lace, Mrs. L. Beckwith, Mitchell, S. Dakota	1 50
Second, Mrs. J. C. Simmering, Indianapolis, Ind	1 00
Honiton lace, specimen, Miss Bertha Frank, Indianapolis, Ind	1 50



Second, Mrs. J. H. Spence, Covington, Ind	\$1 00
Bed set, Anna Kistner, Indianapolis, Ind.	3 00
Guipure lace, Mrs. L. Beckwith, Mitchell, South Dakota.	2 00
Second, Mrs. C. C. Burns, Greensburg, Ind	1 00

CLASS XLVII—Embroidery, Hand Made.

Cotton, Mrs. C. Dille, Greensburg, Ind	\$1 50
Second, Mrs. A. G. Jackson, Bennington, Ind	1 00
Lunch set, Mrs. C. C. Burns, Greensburg, Ind	3 00
Second, Meta Baker, Peoria, Ill	2 00
Doiley set, six or more, Mrs. C. Dille, Greensburg, Ind.	2 00
Second, Mrs. Harriet Slerry, Indianapolis, Ind	1 00
Linen tablecloth and 12 napkins, Mrs. L. A. Moore, Terre Haute, Ind. .	3 00
Second, Anna Kistner, Indianapolis, Ind	2 00
Hostess cloth, Mrs. E. P. Thayer, Greenfield, Ind	2 00
Second, Mrs. W. F. Fugate, Indianapolis, Ind.	1 00
Handkerchief, Anna Kistner, Indianapolis, Ind	1 50
Second, Mrs. J. Liebhardt, Knightstown, Ind	1 00
Silk shirt, white, Anna Kistner, Indianapolis, Ind.	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Infant's silk shirt, Miss Maud Hinsey, Pekin, Ill	2 00
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Table cover, Mrs. Harriet Sperry, Indianapolis, Ind	2 00
Second, Mrs. R. H. Talbott, Lexington, Ky.	1 00
Table scarf, Mrs. Harriet Sperry, Indianapolis, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Piano scarf, Mrs. Harriet Sperry, Indianapolis, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Dresser furnishings, Mrs. E. Buck, Lockland, Ind.	1 50
Second, Mrs. C. C. Burns, Greensburg, Ind	1 00
Couch pillow, Miss Cora Franklin, Indianapolis, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind.	1 00
Toilet cushion, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. A. Sammond, Michigan City, Ind	1 00
Outline point towels, Anna Kistner, Indianapolis, Ind.	1 50
Second, Mrs. L. Beckwith, Mitchell, South Dakota	1 00
Outline specimen, Mrs. L. A. Moore, Terre Haute, Ind.	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Outline carving cloth, Mrs. L. A. Moore, Terre Haute, Ind.	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Kensington, specimen, Mrs. L. A. Moore, Terre Haute, Ind.	2 00
Second, Mrs. R. H. Talbott, Lexington, Ky	1 00
Table center, ambroidered, Miss Lucy Keeper, Indianapolis, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Tapestry, Mrs. L. A. Moore, Terre Haute, Ind.	2 00

Second, Miss Anna Miller, Quincy, Ill	1 00
High art needle work, Mrs. L. A. Moore, Terre Haute, Ind	2 00
Second, Mrs. E. Buck, Lockland, O.	1 00
Tinting and embroidery, Mrs. L. A. Moore, Terre Haute, Ind.	2 00
Second, Mrs. C. J. McClure, Xenia, O.	1 00
Rope silk, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Queen Ann darning, Mrs. A. Sammons, Michigan City, Ind	2 00
Second, Mrs. J. Liebhart, Knightstown, Ind	1 00
Roman embroidery, Mrs. L. A. Moore, Terre Haute, Ind	2 00
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Sorrento embroidery, Mrs. L. A. Moore, Terre Haute, Ind	2 00
Second, Mrs. J. Liebhart, Knightstown, Ind	1 00
Etching in silk, Mrs. L. A. Moore, Terre Haute, Ind	2 00
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Towels, pair, Mrs. C. Dille, Greensburg, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Chamois, Mrs. Harriet Sperry, Indianapolis, Ind	2 00
Second, Alice Kline, Crawfordsville, Ind	1 00
Portieres, pair, Mrs. J. Liebhart, Knightstown, Ind	3 00
Second, M. A. Scott, Indianapolis, Ind	2 00
Denim, specimen, Laura Douglass, Indianapolis, Ind	2 00
Second, Mrs. L. A. Moore, Terre Haute, Ind	1 00
Basket or moile cloth, Miss Ann Miller, Quincy, Ill	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Handkerchief satchet, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Glove satchet, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. Chas. Rusch, Indianapolis, Ind	1 00
Tea cosey, Mrs. A. Sammons, Michigan City, Ind	1 50
Second, Mrs. Laura Blackstock, Lafayette, Ind	1 00
Five o'clock tea, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. L. Alberhart, Indianapolis, Ind	1 00
Corduroy, Miss Maud Hinsey, Pekin, Ind	1 50

Matilda Marsh, Greenfield, Ind., Judge.

CLASS XLVIII—Sewing—Machine and Hand.

Lady's white skirt, Mrs. George Sands, Kokomo, Ind	\$1 50
Second, Mrs. W. T. Hunter, Rising Sun, Ind	1 00
Display of ladies' underwear, Mrs. C. Dille, Greensburg, Ind	3 00
Second, Mrs. C. Lucke, Palmyra, Mo	1 50
Hemstitching, machine, F. A. Cummings, Indianapolis, Ind	1 50
Second, Mrs. George Sands, Kokomo, Ind	1 00
Hemstitching, child's dress, Mrs. Chas. Rusch, Indianapolis, Ind	1 50

High art, machine art work, F. A. Cummings, Indianapolis, Ind	\$2 00
Tinting and embroidery, F. A. Cummings, Indianapolis, Ind	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind	1 00
Table Cover, Mrs. A. Sammons, Michigan City, Ind	1 50
Handkerchief, Mrs. R. D. Stagg, Greensburg, Ind	1 50
Second, May Thornberry, Indianapolis, Ind	1 00
Machine embroidery, F. A. Cummings, Indianapolis	4 00

HAND WORK.

Hemstitching, towel, Mrs. W. S. Hoss, Indianapolis	\$1 50
Second, Laura Bahr, Huntington, Ind	1 00
Hemstitching, sheet and pillow cases, Miss Maud Hinsey, Pekin, Ill . .	2 00
Second, Laura Bahr, Huntington, Ind	1 00
Hemstitching child's dress, Mrs Chas. Nye, Indianapolis	2 00
Second, Mrs. C. C. Burns, Greensburg, Ind	1 00
Drawn work, Mrs. W. F. Jenkins, Indianapolis	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Drawn work, Persian, Mrs. L. A. Moore, Terre Haute, Ind.	2 00
Second, Mrs. A. Sammons, Michigan City, Ind.	1 00
Drawn work, Mexican, Mrs. L. A. Moore, Terre Haute, Ind	2 00
Second, Miss B. Buscher, Indianapolis	1 00
Infant's outfit, Mrs. C. Dille, Greensburg, Ind	4 00
Second, Miss Maud Hinsey, Pekin, Ill	2 00
Infant's dress, Mrs. A. G. Jackson, Bennington, Ind :	2 00
Second, Miss Anna Miller, Quincy, Ill	1 00
Ladies' white skirt, Mrs. L. Beckwith, Mitchell, S. Dakota	2 00
Second, Miss Maud Hinsey, Pekin, Ill	1 00

Matilda Marsh, Greenfield, Ind., Judge.

CLASS XLIX—Fancy Work.

Hand satchel, not embroidered, Miss Bertha Frank, Indianapolis	\$1 50
Second, Miss Cora Franklin, Indianapolis	1 00
Glove satchel, not embroidered, Miss Bertha Frank, Indianapolis . . .	1 50
Second, Mrs. L. Beckwith, Mitchell, S. Dakota	1 00
Magazine holder, Mrs. Harriet Sperry, Indianapolis	1 50
Second, Anna Kistner, Indianapolis	1 00
Toilet cushion, Miss Bertha Frank, Indianapolis	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Couch pillow, Miss Ida Ludlow, Muncie, Ind	1 50
Second, Miss G. Rafort, Indianapolis	1 00
Toilet scarf, Mrs. W. F. Jenkins, Indianapolis	1 50
Second, Mrs. Geo. Sands, Kokomo, Ind.	1 00
Dresser set, not embroidered, Miss Bertha Frank, Indianapolis	1 50
Second, Mrs. W. F. Jenkins, Indianapolis	1 00

Infant's nursery basket, W. S. Blatchley, Indianapolis.	\$1 50
Second, Mrs. L. Beckwith, Mitchell, S. Dakota	1 00
Rug, Miss Anna Miller, Quincy, Ill	1 50
Second, Mrs. E. F. Beck, Quincy, Ill	1 00
Book cover, Anna Kietner, Indianapolis	1 50
Second, Minnie Smith, Boonsboro, Ind	1 00
Lunch set, not embroidered, Mrs. W. F. Jenkins, Indianapolis	2 00
Second, Mrs. W. F. Jenkins, Indianapolis	1 00
Doilies, not embroidered, Mrs. W. F. Jenkins, Indianapolis	1 50
Second, Mrs. W. F. Jenkins, Indianapolis	1 00
Hostess cloth, embroidered, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. W. F. Jenkins, Indianapolis	1 00
Head rest, Mrs. J. B. Powers, Indianapolis	1 50
Second, Mrs. R. H. Talbott, Lexington, Ky	1 00
Reticule, Miss Maud Hinsey, Pekin, Ill	1 50
Second, Mrs. G. A. McLeod, Cincinnati, Ohio	1 00
Fancy apron, Miss Anna Miller, Quincy, Ill	1 50
Second, Mrs. C. Dille, Greensburg, Ind	1 00
Kitchen aprons, Miss Ida Ludlow, Muncie, Ind	1 50
Second, Miss Maud Hinsey, Pekin, Ill.	1 00
Shaving pad, Mrs. W. F. Jenkins, Indianapolis.	1 50
Second, Miss Helen Goodwin, Newcastle, Ind	1 00
Laundry calendar, Miss Maud Hinsey, Pekin, Ill	1 50
Second, Miss Margaret Hills, Delaware, Ohio	1 00
Draper throw, Mrs. L. Beckwith, Mitchell, So. Dakota	1 50
Second, Mrs. E. P. Thayer, Greenfield, Ind	1 00
Housewife, Mrs. L. Hellingsworth, Greenwood, Ind	1 50
Second, Mrs. J. B. Powers, Indianapolis	1 00
Table cover, Mrs. W. F. Jenkins, Indianapolis.	1 50
Second, Miss Bertha Frank, Indianapolis.	1 00
Table center, Mrs. Harriet Sperry, Indianapolis	1 50
Second, M. A. Scott, Indianapolis	1 00
Photograph case, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, Mrs. Harriet Sperry, Indianapolis.	1 00
Fancy opera bag, Mrs. Harriet Sperry, Indianapolis	1 50
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Laundry bag, Mrs. L. A. Moore, Terre Haute, Ind	1 50
Second, M. A. Scott, Indianapolis	1 00
Darning bag, Mrs. C. Dille, Greensburg, Ind.	1 50
Second, Mrs. R. D. Stagg, Greensburg, Ind.	1 00
Dust bag, M. A. Scott, Indianapolis.	1 50
Second, Mrs. A. Sammons, Michigan City, Ind	1 00
Lamp shade, Sallie Bacon, Broad Ripple, Ind	1 50
Table mats, fancy, Miss Ida Ludlow, Muncie, Ind	1 50
Second, Miss Nellie Mount, Indianapolis	1 00
Cord ball, fancy, Mrs. G. A. McLeod, Cincinnati, Ohio	1 50

Second, E. R. Henley, Westfield, Ind	\$1 00
Paper work, specimen, Sallie Bacon, Broad Ripple, Ind	1 50
Second, Sallie Bacon, Broad Ripple, Ind	1 00
Paper work, display, Sallie Bacon, Broad Ripple, Ind	2 00
Second, Sallie Bacon, Broad Ripple, Ind	1 00
Fancy mantle drape, Miss Ida Ludlow, Muncie, Ind	2 00
Second, M. A. Scott, Indianapolis	1 00
Quilt, silk needle-work, Miss Maud Hinsey, Pekin, Ill	2 00
Second, Mrs. R. H. Talbott, Lexington, Ky.	1 00
Crazy quilt, Mrs. E. F. Beck, Quincy, Ill	2 00
Second, Miss Maud Hinsey, Pekin, Ill	1 00
Chair stripe, Miss Anna Miller, Quincy, Ill	1 50
Silk purse, Mrs. George Sands, Kokomo, Ind	2 00
Second, Florence Blue, Mapleton, Ind	1 00

Mrs. Fannie Shideler, Irvington, Ind., Judge.

CLASS L.—Business Exhibit.

Display millinery, Mrs. G. D. Buswick, Kokomo, Ind	\$20 00
Second, Mrs. G. D. Buswick, Kokomo, Ind	15 00
Display dressmaking, Mrs. Elizabeth West, Anderson, Ind	20 00
Second, Mrs. G. D. Buswick, Kokomo Ind	15 00
Display hair-work, Mrs. L. Beckwith, Mitchell, So. Dakota	30 00
Second, Mrs. G. D. Buswick, Kokomo, Ind	15 00

Mrs. Jessie Moore, Greensburg, Ind., Judge.

CLASS LI—Decorative Art Work.

Hammered or repousse work, Mrs. A. Matsomato, Indianapolis	\$2 00
Second, Mrs. A. Matsomato, Indianapolis.	1 00
Modeling in clay, Miss Minnie Akass, Indianapolis	4 00
Second, Lucy Wilson, Indianapolis	2 00
Carved, or incision work, Miss Minnie Akass, Indianapolis.	3 00
Second, Miss Minnie Akass, Indianapolis.	2 00
Bas-relief, Miss Helen Goodwin, Newcastle, Ind.	4 00
Second, Mrs. C. E. Folger, Indianapolis	2 00
Wood carving display	
Wood Carving specimen, Mrs. E. C. Folger, Indianapolis.	4 00
Second, Mrs. Wm. Welch, Indianapolis.	2 00
Painting on bolting cloth, Mrs. Wm. Welch, Indianapolis	2 00
Second, Anna Kistner, Indianapolis	1 00
Painting chamois skin, Miss Helen Goodwin, Newcastle, Ind	2 00
Second, Anna Kistner, Indianapolis	1 00
Painting matting, Miss Minnie Akass, Indianapolis	2 00

Second, Mrs. G. O. Buswick, Kokomo, Ind	\$1 00
Tapestry painting, Mrs. Wm. H. Welch, Indianapolis	2 00
Second, Miss Minnie Akass, Indianapolis	1 00
Painted menu cards, Miss Minnie Akass, Indianapolis	5 00
Second, Minnie Anderson, Indianapolis	3 00
Blotting cards, Miss Ida Ludlow, Muncie, Ind	2 00
Second, Mrs. Wm. Welch, Indianapolis	1 00
Calender, M. L. Julian, Indianapolis	2 00
Second, Jas. Ritchy, Indianapolis	1 00
Letter case, Miss Minnie Akass, Indianapolis	2 00
Second, Mrs. W. F. Jenkins, Indianapolis	1 00
Visiting list, Anna Kistner, Indianapolis	2 00
Second, Miss Minnie Akass, Indianapolis	1 00
Photograph frame, M. L. Julian, Indianapolis	2 00
Second, Mrs. S. J. Greenleaf, Hagerstown, Ind.	1 00
Painted fire screen, mounted, Mrs. Wm. Welch, Indianapolis	4 00
Second, Mary Nesbit, Castleton, Ind	2 00
Photograph display, Miss Minnie Akass, Indianapolis	5 00
Photograph specimen, Miss Minnie Akass, Indianapolis	4 00
Best collection articles, M. L. Julian, Indianapolis	4 00
Second, Mrs. S. J. Greenleaf, Hagerstown, Ind	2 00
Best bun bon, M. L. Julian, Indianapolis	3 00
Second, Mrs. W. T. Hunter, Rising Sun, Ind	2 00
Decorated tray, Mrs. Wm. Welch, Indianapolis	2 00
Second, Mrs. S. J. Greenleaf, Hagerstown, Ind.	1 00
Tapestry ceiling, Miss Minnie Akass, Indianapolis	4 00
Second, Millie Higgins, Indianapolis	2 00

Mrs. W. M. Blackstock, Judge.

CLASS LII—Art Work, Amateur.

Portrait in oil, life, Miss Minnie Akass, Indianapolis	\$10 00
Second, Minnie Anderson, Indianapolis	5 00
Portrait in crayon, Miss Minnie Akass, Indianapolis	4 00
Second, Miss Minnie Akass, Indianapolis	2 00
Portrait in pastel, life, Minnie Anderson, Indianapolis	4 00
Second, Ida L. Craft, Indianapolis	2 00
Portrait in water colors, life, Mrs. G. A. McLeod, Cincinnati, Ohio	6 00
Second, Minnie Anderson, Indianapolis	3 00
Ideal head in oil, Minnie Anderson, Indianapolis	2 00
Second, Ida L. Craft, Indianapolis	1 00
Ideal head in crayon, Minnie Anderson, Indianapolis	2 00
Second, Lena Ingraham, Indianapolis	1 00
Ideal head in water colors, Minnie Akass, Indianapolis	2 00
Second, Minnie Anderson, Indianapolis	1 00

Ideal figure in oil, Mrs. E. Buck, Lockland, Ohio	\$2 00
Second, Mrs. G. A. McLeod, Cincinnati, Ohio	1 00
Ideal figure in crayon, Minnie Anderson, Indianapolis	2 00
Second, Minnie Akass, Indianapolis	1 00
Ideal figure in water colors, Minnie Akass, Indianapolis	2 00
Second, Ida L. Craft, Indianapolis	1 00
Specimen flowers in oil, Minnie Akass, Indianapolis	2 00
Second, Minnie Anderson, Indianapolis	1 00
Specimen flowers in oil, original, Miss Bell Morgan, Indianapolis	2 00
Second, Minnie Akass, Indianapolis	1 00
Display flowers in oil, Miss Minnie Akass, Indianapolis	4 00
Second, Miss Bell Morgan, Indianapolis	2 00
Specimen flowers in water colors, Jas. Ritchey, Indianapolis	2 00
Second, Millie Higgins, Indianapolis	1 00
Specimen flowers in water colors, original, Miss Minnie Akass	2 00
Second, Minnie Anderson, Indianapolis	1 00
Display flowers in water colors, Ida L. Craft, Indianapolis	4 00
Second, Lelia K. Galpin, Indianapolis	2 00
Specimen fruit or original copy, Meta Baker, Peoria, Ill	2 00
Second, Mrs. F. Prince, Indianapolis	1 00
Specimen fruit, water colors, copy, Millie Higgins, Indianapolis	2 00
Second, Minnie Anderson, Indianapolis	1 00
Specimen fruit, oil, original, Miss Edna Kingsberry, Indianapolis	2 00
Second, Lucy Wilson, Indianapolis	1 00
Specimen fruit, water colors, original, Miss Ida Ludlow, Muncie, Ind	2 00
Second, Miss Edna Kingsbury, Indianapolis	1 00
Display of fruit or vegetables, oil, second award, Mrs. F. E. Wolcott, Indianapolis	2 00
Display, fruit or vegetables, water colors, Minnie Anderson, Indianapolis	4 00
Second, Lena Ingraham, Indianapolis	2 00
Specimen, animal, oil, copy, Mrs. E. P. Thayer, Greenfield, Ind	2 00
Second, Minnie Akass, Indianapolis	1 00
Specimen, animal, water colors, copy, Minnie Akass, Indianapolis	2 00
Second, Dorothy Cole, Rushville, Ind	1 00
Specimen, game, oil, Miss Bell Morgan, Indianapolis	2 00
Second, Minnie Anderson, Indianapolis	1 00
Specimen, game, water colors, Minnie Anderson, Indianapolis	2 00
Second, Lucy Wilson, Indianapolis	1 00
Specimen, game pastel, Minnie Anderson, Indianapolis	2 00
Second, Miss Ida Ludlow, Muncie, Ind	1 00
Game, animal, oil, life, Miss Minnie Akass, Indianapolis	4 00
Second, Miss Minnie Akass, Indianapolis	2 00
Game, animal, water colors, life, Miss Minnie Akass, Indianapolis	4 00
Second, Minnie Anderson, Indianapolis	2 00
Game, still life, oil, Minnie Anderson, Indianapolis	2 00
Second, Miss Edna Kingsbury, Indianapolis	1 00

Specimen, still life, water colors, Mrs. A. E. Brown, Indianapolis	\$2 00
Second, Minnie Anderson, Indianapolis	1 00
Specimen, still life, pastel, Minnie Anderson, Indianapolis	2 00
Second, Miss Ida Ludlow, Muncie, Ind	1 00
Specimen, landscape, oil, A. M. Garshwiler, Indianapolis	2 00
Second, James Ritchey, Indianapolis	1 00
Specimen, landscape, water colors, Ida Craft, Indianapolis	2 00
Second, James Ritchey, Indianapolis	1 00
Specimen, landscape, pastel, A. M. Garshwiler, Indianapolis	2 00
Second, James Ritchey, Indianapolis	1 00
Display, landscape painting, Minnie Akass, Indianapolis	4 00
Second, Minnie Anderson, Indianapolis	2 00
Sketch, nature, oil, Mrs. E. P. Thayer, Greenfield, Ind	2 00
Second, Minnie Akass, Indianapolis	1 00
Sketch, nature, water colors, Mrs. E. P. Thayer, Greenfield, Ind	2 00
Second, Minnie Akass, Indianapolis	1 00
Sketch, nature, crayon, Mrs. W. T. Fugate, Indianapolis	2 00
Second, Minnie Akass, Indianapolis	1 00
Sketch, nature, pastel, Mrs. W. T. Fugate, Indianapolis	2 00
Second, Minnie Anderson, Indianapolis	1 00
Spring scene in oil, Miss Lizzie Cox, Mooresville, Ind	2 00
Second, Mrs. E. P. Thayer, Greenfield, Ind	1 00
Spring scene in water colors, Minnie Akass, Indianapolis	2 00
Second, Miss Edna Kingsbury, Indianapolis	1 00
Summer scene in oil	2 00
Second, Miss Lizzie Cox, Mooresville, Ind	1 00
Summer scene in water colors, Millie Higgins, Indianapolis	2 00
Second, Minnie Anderson, Indianapolis	1 00
Autumn scene in oil, Miss Lizzie Cox, Mooresville, Ind	2 00
Second, Minnie Akass, Indianapolis	1 00
Autumn scene in water colors, Miss Margaret Hills, Delaware, O	2 00
Second, Minnie Akass, Indianapolis	1 00
Winter scene in oil, Francis Marquette, Philo, Ill	2 00
Second, Miss Bell Morgan, Indianapolis	1 00
Winter scene in water colors, Minnie Akass, Indianapolis	2 00
Second, Miss Helen Goodwin, New Castle, Ind	1 00
Marine scene in oil, Miss Belle Morgan, Indianapolis	2 00
Second, Mrs. E. H. Meyer, Indianapolis	1 00
Marine scene in water colors, Ida L. Craft, Indianapolis	2 00
Second, Millie Higgins, Indianapolis	1 00
Interior scene with figures, oil, Mrs. W. F. Jenkins, Indianapolis	2 00
Second, Minnie Akass, Indianapolis	1 00
Interior scene with water colors, Miss Edna Kingsbury, Indianapolis . .	2 00
Second, Minnie Anderson, Indianapolis	1 00
Specimen pen and ink sketch	2 00
Second, Minnie Anderson, Indianapolis	1 00

Display pen and ink sketch, Miss Ida Ludlow, Muncie, Ind	\$4 00
Second, Minnie Anderson, Indianapolis	2 00
Specimen drawings, copy, Minnie Akass, Indianapolis	2 00
Second, Mrs. G. A. McLeod, Cincinnati, O	1 00
Specimen drawings, original, Miss Edna Kingsbury, Indianapolis	2 00
Second, Lena Ingraham, Indianapolis	1 00
Display drawings, copy, Minnie Anderson, Indianapolis	2 00
Second, Lena Ingraham, Indianapolis	1 00
Display drawings, original, Minnie Akass, Indianapolis	2 00
Second, Lena Ingraham, Indianapolis	2 00
Specimen drawings, fancy head or figure, Minnie Anderson, Indianapolis	2 00
Second, Millie Higgins, Indianapolis	1 00
Drawing Indiana, not traced, Minnie Akass, Indianapolis	2 00
Drawing map of United States, not traced, Minnie Akass, Indianapolis	2 00
Drawing, architectural, original, Lena Ingraham, Indianapolis	2 00
Drawing, mechanical, Lena Ingraham, Indianapolis	2 00
Drawing, charcoal, Mrs. G. A. McLeod, Cincinnati, O	2 00
Second, Lena Ingraham, Indianapolis	1 00
Painting on china, specimen of Dresden, C. Carriger, Indianapolis	2 00
Second Mrs. Jennie Brown, Indianapolis	1 00
Painting on china, Dresden, display, Mrs. W. T. Fugate, Indianapolis	4 00
Second, Mrs. Jennie Brown, Indianapolis	2 00
Painting on china, royal Worcester, spec., Mrs. E. P. Thayer, Greenfield	2 00
Second, Mrs. W. T. Hunter, Rising Sun, Ind	1 00
Painting on clock, Mrs. W. T. Fugate, Indianapolis	4 00
Second, Janie Greer, Indianapolis	2 00
Painting on china, relief gold, Janie Greer, Indianapolis	2 00
Second, Miss A. E. Brown, Indianapolis	1 00
Painting on china enamel, Janie Greer, Indianapolis	2 00
Second, C. Carriger, Indianapolis	1 00
Painting on china, colored gold, Janie Greer, Indianapolis	2 00
Second, Mrs. A. R. Henley, Indianapolis	1 00
Painting on china, original ornamental pieces, Janie Greer, Indianapolis	4 00
Second, Mrs. Jennie Brown, Indianapolis	2 00
Painting on china, original flower design, Mrs. Jennie Brown, Indianapolis.	4 00
Second, Mrs. W. F. Fugate, Indianapolis.	2 00
Painting on china, Doulton specimen, C. Carriger, Indianapolis.	4 00
Second, Janie Greer, Indianapolis	2 00
Painting on china fruit set, Mrs. W. F. Fugate, Indianapolis.	4 00
Second, Mrs. E. H. Meyer, Indianapolis	2 00
Painting on china chocolate set, Miss Ida Ludlow, Muncie, Ind	4 00
Second, Mrs. Albert Henley, Indianapolis	2 00
Painting on china soup set, Mrs. W. F. Fugate, Indianapolis.	4 00
Second, Mrs. E. P. Thayer, Greenfield, Ind	2 00
Painting on china tea set, Janie Greer, Indianapolis.	4 00

Second, Mrs. W. F. Fugate, Indianapolis	\$2 00
Painting on china pudding set, Mrs. E. H. Meyers, Indianapolis	4 00
Second, Miss Ida Ludlow, Indianapolis	2 00
Painting on china manicure set, Jessie Bell, Indianapolis	4 00
Second, Mrs. Jennie Brown, Indianapolis	2 00
Painting on china icecream set, Mrs. Jennie Brown, Indianapolis	4 00
Second, Mrs. W. F. Fugate, Indianapolis	2 00
Painting on china jardiniere, Janie Greer, Indianapolis	4 00
Second, C. Carriger, Indianapolis	2 00
Ideal head, china or porcelain, Mrs. E. H. Meyer, Indianapolis	2 00
Second, Mrs. E. P. Thayer, Greenfield, Ind	1 00
Ideal figure, china or porcelain, Ida Craft, Indianapolis	2 00
Second, Mrs. E. P. Thayer, Greenfield, Ind	1 00

Mrs. Blackstock, Judge.

CLASS LIII—Art Work, Professional.

Portrait in oil, Ellen Ingraham, Indianapolis	\$15 00
Second, Margaret Overbeck, Cambridge, Ind	8 00
Portrait in water colors, Ellen Ingraham, Indianapolis	10 00
Second, Ellen Ingraham, Indianapolis	5 00
Portrait in crayon, Miss Sue Ellis, Philadelphia, Ill.	6 00
Second, Mrs. C. E. Spahr, Indianapolis	3 00
Portrait in pastel, Mrs. C. E. Folger, Indianapolis	10 00
Second, Prirsche John, Indianapolis	5 00
Ideal head in oil, Ellen Ingraham, Indianapolis	6 00
Second, Ellen Ingraham, Indianapolis	3 00
Ideal head in water colors, Ellen Ingraham, Indianapolis	4 00
Second, Mrs. C. E. Spahr, Indianapolis	2 00
Ideal figure in oil, Ellen Ingraham, Indianapolis	6 00
Second, Margaret Overbeck, Cambridge, Ind	3 00
Ideal figure in water colors, Ellen Ingraham, Indianapolis	4 00
Second, Imogene Brown, Crawfordsville, Ind	2 00
Specimen flowers in oil, Ellen Ingraham, Indianapolis	4 00
Second, Mrs. E. C. Folger, Indianapolis	2 00
Specimen flowers in water colors, Imogene Brown, Crawfordsville, Ind. .	4 00
Second, Ellen Ingraham, Indianapolis	2 00
Display water colors, flowers, Ellen Ingraham, Indianapolis	6 00
Second, Imogene Brown, Crawfordsville, Ind	3 00
Specimen fruit or vegetable in oil, Ellen Ingraham, Indianapolis	4 00
Second	2 00
Specimen fruit or vegetable in water colors, Ellen Ingraham, Indianapo- lis	4 00
Second, Imogene Brown, Crawfordsville, Ind	2 00
Display, fruit or vegetable, oil, Minnie Hines	4 00

Second, Imogene Brown, Indianapolis	\$2 00
Display, fruit or vegetable, water colors, Imogene Brown, Indianapolis .	4 00
Animal, in oil, Miss Sue Ennis, Philo, Ill.	4 00
Second, Mrs. E. C. Folger, Indianapolis	2 00
Animal, in water colors, Mrs. C. E. Spahr, Indianapolis	4 00
Second, A. L. Preston, Haughville Ind	2 00
Game piece, oil, Mrs. C. E. Spahr, Indianapolis	4 00
Second, Mrs. E. C. Folger, Indianapolis	2 00
Game piece, pastel,	
Still life, oil, Mrs. C. E. Folger, Indianapolis	4 00
Second, Miss Ida Ludlow, Muncie, Ind.	2 00
Still life, water colors, Mrs. George Sands, Kokomo, Ind.	4 00
Second, Imogene Brown, Crawfordsville, Ind	2 00
Still life, pastel, Mrs. C. E. Spahr, Indianapolis	4 00
Second, Mrs. E. C. Folger, Indianapolis	2 00
Specimen landscape, oil, Mrs. E. C. Folger, Indianapolis	4 00
Second, Miss Sue Ennis, Philo, Ill.	2 00
Specimen landscape, water colors, Ellen Ingraham, Indianapolis	4 00
Second, Imogene Brown, Crawfordsville, Ind	2 00
Specimen landscape, pastel, Mrs. C. E. Spahr, Indianapolis	4 00
Display, landscape painting, Mrs. E. C. Folger, Indianapolis	6 00
Second, A. L. Preston, Haughville, Ind	3 00
Sketch, nature, oil, Margaret Overbeck, Cambridge, Ind	4 00
Second, Mrs. C. E. Spahr, Indianapolis	2 00
Sketch, nature, water colors, Mrs. C. E. Spahr, Indianapolis	4 00
Second, Imogene Brown, Crawfordsville, Ind	2 00
Sketch, nature, crayon, Minnie Hines	4 00
Second, Miss Sue Ennis, Philo, Ill.	2 00
Display sketches, nature, Mrs. C. E. Spahr, Indianapolis	6 00
Second, A. L. Preston, Haughville, Ind.	3 00
Interior scene, figures, oil, Miss Lizzie Cox, Mooresville, Ind	4 00
Second, Ellen Ingraham, Indianapolis	2 00
Drawing, from antique head, Mr. E. E. Sickler	4 00
Second, Minnie Hines	2 00
Drawing, from antique figure, Mrs. C. E. Spahr, Indianapolis	4 00
Second, Mrs. C. E. Spahr, Indianapolis	2 00
Drawing, animal, Minnie Akass, Indianapolis	4 00
Second, Minnie Hines	2 00
Drawing, architectural, Lena Ingraham, Indianapolis	4 00
Second, Lena Ingraham, Indianapolis	2 00
Drawing, mechanical, H. C. Westfall, Terre Haute, Ind	4 00
Second, H. C. Westfall, Terre Haute, Ind.	2 00
Pen and ink drawing, Miss Sue Ennis, Philo, Ill	4 00
Second, Mrs. E. C. Folger, Indianapolis	2 00
Wash drawing, Minnie Akass.	4 00

Second, Lena Ingraham, Indianapolis	\$2 00
Charcoal drawing, from life, Minnie Akass, Indianapolis	3 00
Second, Minnie Akass, Indianapolis	2 00
Illustrated poem, Mrs. G. A. McLeod, Cincinnati, Ohio	8 00
Second, Miss Sue Ennis, Philo, Ill	4 00
Painting on china, Dresden, Mrs. W. S. Day, Indianapolis	4 00
Second, Mrs. J. H. Orndorff, Indianapolis	2 00
Painting on china, Dresden display, M. L. Julian, Indianapolis	6 00
Second, Mrs. S. J. Greenleaf, Hagerstown, Ind	3 00
Painting on china, Roy, Worcester, spec., M. L. Julian, Indianapolis	4 00
Second, Mrs. Wm. Welch, Indianapolis	2 00
Painting on china, lamp, Mrs. Wm. Welch, Indianapolis	4 00
Second, Mrs. L. Davis, Columbus, Ohio	2 00
Painting on china, ornamental pieces, M. L. Julian, Indianapolis	4 00
Second, Adella Sloan, Indianapolis	2 00
Painting on china, flower design, Mrs. L. Davis, Columbus, Ohio	4 00
Second, Nora, Prentice, Columbus, Ohio	2 00
Painting on china, relief gold, Adella Sloan, Indianapolis	4 00
Second, M. L. Julian, Indianapolis	2 00
Painting on china, Doulton spec, Mrs. S. J. Greenleaf, Hagerstown, Ind.	4 00
Second, Mrs. Wm. Welch, Indianapolis	2 00
Painting on china, enamel, Mrs. S. W. Day, Indianapolis	4 00
Second, Nora Prentice, Columbus, Ohio	2 00
Painting on china, clock, Adella Sloan, Indianapolis	4 00
Second, Mrs. L. Davis, Columbus, Ohio	2 00
Painting on china, chocolate set, Mrs. S. W. Day, Indianapolis	6 00
Second, M. L. Julian, Indianapolis	3 00
Painting on china, fruit set, M. L. Julian, Indianapolis	6 00
Second, Mrs. L. Davis, Columbus, Ohio	3 00
Painting on china, pudding set, Mrs. Wm. Welch, Indianapolis	6 00
Second, M. L. Julian, Indianapolis	3 00
Painting on china, soup set, Mrs. Wm. Welch, Indianapolis	6 00
Second, Mrs. L. Davis, Columbus, Ohio	3 00
Painting on china, tea set, M. L. Julian	6 00
Second, Mrs. L. Davis, Columbus, Ohio	3 00
Painting on china, manicure set, M. L. Julian	6 00
Second, Mrs. W. S. Day, Indianapolis	3 00
Painting on china, ice cream set, Mrs. W. S. Day, Columbus, Ohio	6 00
Second, Mrs. Wm. Welch, Indianapolis	3 00
Jardiniere, M. L. Julian, Indianapolis	4 00
Second, Nora Prentice, Columbus, Ohio	2 00
China conventional design, Mrs. L. Davis, Columbus, Ohio	4 00
Second, M. L. Julian, Indianapolis	2 00
Ideal head, M. L. Julian, Indianapolis	4 00
Second, Mrs. J. H. Orndorff, Indianapolis	2 00
Ideal figure, Adella Sloan, Indianapolis	4 00

Second, Mrs. L. Davis, Columbus, Ohio	\$2 00
Display painting on china, M. L. Julian, Indianapolis	10 00
Second, Mrs. Wm. Welch, Indianapolis	5 00
Display painting in oils, Ellen Ingraham, Indianapolis	10 00
Second, Mrs. C. E. Spahr, Indianapolis	5 00
Display painting in water colors, Ellen Ingraham, Indianapolis	10 00
Second, Margaret Overbeck, Cambridge City, Ind	5 00

Mrs. Wm. Blackstock, Judge.

CLASS XLIV—Table Luxuries.

Maple syrup, Mrs. H. Johnson, Howland, Ind	\$3 00
Second, Mrs. L. Hollingsworth, Greenwood, Ind	2 00
Maple sugar, Mrs. Chas. Nye, Indianapolis	2 00
Second, Mrs. W. Z. Hutchinson, Indianapolis	1 00
Bread loaf, wheat, Mrs. S. W. Hoss, Indianapolis	1 50
Second, Fannie Hinsley, Indianapolis	1 00
Bread, saltrising, wheat, Fannie Hinsley, Indianapolis	1 50
Second, Imogene Brown, Crawfordsville, Ind	1 00
Bread, graham, wheat, Rebecca Hessong, Broad Ripple, Ind	1 50
Second, Mrs. V. L. Wilson, Knightstown, Ind	1 00
Bread, Boston brown, H. C. Raney, Indianapolis	1 50
Second, Mrs. DeWuse, Indianapolis	1 00
Rusk, Mrs. I. M. Porter, Indianapolis	1 50
Second, E. R. Henley, Westfield, Ind	1 00
Corn pone, E. R. Henley, Westfield, Ind	1 50
Second, Mary Nesbit, Castleton, Ind	1 00
Twelve rolls, Mrs. W. S. Hoss, Indianapolis	1 50
Second, Mrs. I. M. Porter, Indianapolis	1 00
Ginger bread, Rebecca Hessong, Broad Ripple, Ind	1 50
Second, Mrs. J. W. Lucas, Indianapolis	1 00
Fig cake, Rebecca Hessong, Broad Ripple	1 50
Second, Mrs. L. B. Hoover, Indianapolis	1 00
Layer cake, carmel, Rebecca Hessong, Broad Ripple	1 50
Second, Miss Ann Muzzy, Indianapolis	1 00
Angel food, Rebecca Hessong, Broad Ripple	1 50
Second, Mrs. Bery Boyd, Indianapolis	1 00
Hickory nut cake, Mrs. E. T. Akass, Indianapolis	1 50
Second, Miss Ann Muzzy, Indianapolis	1 00
Imperial cake, Mrs. W. O. Ford, Indianapolis	1 50
Second, Eliza Boyles, Gaston, Ind	1 00
Fruit cake, Mrs. C. H. Marshall, Crawfordsville, Ind	3 00
Second, Miss Ann Muzzy, Indianapolis	2 00
White cake, H. C. Raney, Indianapolis	1 50
Second, Eliza Boyles, Gaston, Ind	1 00

Chocolate cake, layer, Mrs. Howard Johnson, Howland, Ind	\$2 00
Second, Mrs. H. Christian, Indianapolis	1 00
Chocolate cake, loaf, Emily Jackson, Indianapolis	2 00
Second, M. H. Jeffries, Franklin, Ind	1 00
Perfection cake, Eliza Boyles, Gaston, Ind	1 50
Second, Mrs. John Powers, Indianapolis	1 00
Crullers, Mrs. E. T. Akass, Indianapolis	1 50
Second, Mrs. John Powers, Indianapolis	1 00
Cream puff, Mrs. John Powers, Indianapolis	1 50
Second, Emily Jackson, Indianapolis	1 00
Cookies, Emma Minger, Haughville, Ind	1 50
Second, Mrs. Annie Tucker, Indianapolis	1 00
Kisses, Mrs. L. B. Hoover, Indianapolis	1 50
Second, Mrs. W. B. Flick, Lawrence, Ind	1 00
Meringues, Mrs. Jno Powers, Indianapolis	1 50
Second	1 00
English plum pudding, Mrs. Chas. Nye, Indianapolis	1 50
Second Mrs. Jno. Powers, Indianapolis	1 00
Jellies, collection, Mrs. Jno. Bennett, Indianapolis	3 00
Second, Mrs. C. L. Wilson, Knightstown, Ind	2 00
Preserves, collection, Mrs. Jno. Bennett, Indianapolis	3 00
Second, Mrs. W. L. Hunter, Rising Sun, Ind	2 00
Fruit butters, collection, Mrs. V. L. Wilson, Knightstown, Ind	3 00
Second, Mrs. W. L. Hunter, Rising Sun, Ind	2 00
Canned fruit, collection, Mrs. V. L. Wilson, Knightstown, Ind	5 00
Second, Mrs. W. Z. Hutchinson	3 00
Salad, meat, Mrs. W. L. Hoss, Indianapolis	1 50
Second, Florence Blue, Mapleton, Ind	1 00
Salad, fish, Mrs. W. S. Hoss, Indianapolis	1 50
Second, H. C. Raney, Indianapolis	1 00
Salad, vegetable, H. C. Raney, Indianapolis	1 50
Second, M. H. Jeffries, Franklin, Ind	1 00
Cheese straws, Mrs. L. Hollingsworth, Greenwood, Ind	1 00
Second, M. H. Jeffries, Franklin, Ind	50
Saratoga chips, Mrs. Dewuse, Indianapolis	1 00
Second, Mrs. W. B. Flick, Lawrence, Ind	50
Boiled tongue, Mrs. L. Hollingsworth, Greenwood, Ind	1 50
Second, Mrs. Annie Tucker, Indianapolis	1 00
Cooked ham, Mrs. L. Hollingsworth, Greenwood, Ind	1 50
Second, Mary Walters, North Indianapolis	50
Veal loaf, Mrs. L. B. Hoover, Indianapolis	1 50
Second, Mrs. W. Lucas, Indianapolis	1 00
Beef loaf, Mrs. W. B. Flick, Lawrence, Ind	1 50
Second, Mrs. L. G. Hoover, Indianapolis	1 00
Spiced cherries, Mrs. Jno. Powers, Indianapolis	1 00
Second, Mrs. W. B. Flick, Lawrence, Ind	50

Sweet pickles, colored, Mrs. W. T. Hunter, Rising Sun, Ind	\$2 00
Second, Mrs. V. L. Wilson, Knightstown, Ind	1 00
Mixed pickles, Mrs. Annie Tucker, Indianapolis	1 50
Second, Mrs. W. T. Hunter, Rising Sun, Ind	1 00
Cucumber pickles, Mrs. I. M. Porter, Indianapolis	1 50
Second, Mary Walters, North Indianapolis	1 00
Peach pickles, Mrs. W. S. Hoss, Indianapolis	2 00
Second, Mrs. W. A. Ford, Indianapolis	1 00
Pear pickles, Mrs. Annie Tucker, Indianapolis	2 00
Second, Mrs. W. S. Hoss, Indianapolis	1 00
Tomato catsup, Florence Blue, Mapleton	1 00
Second, Mrs. L. B. Hoover, Indianapolis	50
Cucumber catsup, Mrs. W. T. Hunter, Rising Sun, Ind	1 00
Second, Mrs. L. B. Hoover, Indianapolis	50
Chili sauce, Florence Blue, Mapleton, Ind	1 50
Second, Mrs. I. M. Porter, Indianapolis	1 00
Boston baked beans, Charlotte B. Geyer.	1 00
Second, Mrs. Annie Tucker, Indianapolis.	50
Baked apples, Mrs. L. B. Hoover, Indianapolis	1 00
Second, H. C. Raney, Indianapolis.	50
Cranberry sauce, Mrs. Annie Tucker, Indianapolis.	1 00
Second, H. C. Raney, Indianapolis.	50
Gelatine dessert, Mrs. Jno. Powers, Indianapolis.	1 50
Second, Mrs. L. Hollingsworth, Greenwood, Ind.	1 00
Collection French candies, Mrs. DeWuse, Indianapolis.	1 50
Second, Mrs. E. T. Akass, Indianapolis.	1 00
Collection taffies, Mrs. Jno. Powers, Indianapolis	1 50

Maggie F. Steele, Greenfield, Ind., Judge.

CLASS LV—Children's Department.

Loaf bread, wheat, yeast, Tula Hoss, Indianapolis.	\$1 50
Second, May Argedine, Kokomo, Ind.	1 00
Loaf bread, salt rising, Osie Cline, Greenwood, Ind	1 50
Second, Josie Blue, Mapleton, Ind.	1 00
Salted meat, Josie Blue, Mapleton, Ind.	1 50
Second, Tula Hoss, Indianapolis.	1 00
Salad, fish, Josie Blue, Mapleton, Ind	1 50
Second, Imogene Hoss, Indianapolis	1 00
Salad, vegetable, Mrs. M. Hoover, Indianapolis.	1 50
Second, Josie Blue, Mapleton, Ind.	1 00
Saratoga chips, Osie Cline, Greenwood, Ind.	1 50
Second, Mrs. M. Hoover, Indianapolis	1 00
Orange or lemon cake, Pearl Heartpence, Indianapolis.	1 50
Second, Josie Hoss, Mapleton, Ind.	1 00

Hickorynut cake, Ora Porter, Indianapolis	\$1 50
Second, Imogene Hoss, Indianapolis	1 00
Chocolate cake, Josie Blue, Mapleton, Ind	1 50
Second, Bertha M. Jackson, Mapleton, Ind	1 00
Sponge cake, Imogene Hoss, Indianapolis.	1 50
Second, May Argedine, Kokomo, Ind.	1 00
Angel food, May Argedine, Kokomo, Ind.	1 50
Second, Imogene Hoss, Indianapolis	1 00
Desert, any kind, Imogene Hoss, Indianapolis	1 50
Second, May Argedine, Kokomo, Ind.	1 00
Cookies, Pearl Heartpence, Indianapolis	1 50
Second, Miss Nora Hutchinson, Indianapolis	1 00
Jellies, collection, Mrs. Mollie Frost, Indianapolis.	1 50
Second, Imogene Hoss, Indianapolis	1 00
Pickles, mixed, Tula Hoss, Indianapolis	1 50
Second, Osie Cline, Greenwood, Ind.	1 00
Pickles, cucumbers, Ora Porter, Indianapolis	1 50
Second, Bertha Jackson, Mapleton, Ind.	1 00
Popcorn, Miss Mary Frost, West Indianapolis.	1 50
Second, May Argedine, Kokomo, Ind.	1 00
Preserves, collection, Miss Nora Hutchinson, Indianapolis	1 50
Second, Miss Tula Hoss, Indianapolis	1 00
Collection taffies, Osie Cline, Greenwood, Ind	1 50
Garment, hand made, Miss Mary Frost, West Indianapolis	1 50
Second, Mrs. J. H. Spence, Covington, Ind	1 00
Embroidery, cotton, Miss Ella Jackson, Bennington, Ind	1 50
Second, Goldie Waggaman	1 00
Embroidery, silk spec., Bertha Jackson, Mapleton	1 50
Second, Goldie Waggaman	1 00
Banners, Mabel Hunter	1 50
Second, Mrs. J. H. Spence, Covington, Ind	1 00
Dressed doll and wardrobe, Imogene Hoss, Indianapolis	1 50
Second, Ora Porter, Indianapolis	1 00
Crochet work, spec, Miss Emma Case	1 50
Second, May Thornberry, Indianapolis	1 00
Crochet skirt, Miss Ella Jackson, Bennington, Ind	1 50
Second, Daisy Waggaman, Kokomo, Ind	1 00
Pair crochet mittens, Jessie Bennett	1 50
Second, Minnie Hines	1 00
Tidy, May Argedine, Kokomo, Ind	1 50
Second, Jessie Bennett	1 00
Pin cushion, Osie Cline, Greenwood, Ind	1 50
Second, Miss Cassie Dill, Greensburg, Ind	1 00
Dresser or bureau set, Tula Hoss, Indianapolis	1 50
Second, Imogene Hoss, Indianapolis	1 00
Fancy satchets, May Argedine, Kokomo, Ind	1 50

Second, May Thornberry	\$1 00
Throw or drape, Pearl Heartpence, Indianapolis	1 50
Second, Miss Ella Jackson, Bennington, Ind	1 00
Scrap book, Miss Imogene Hoss, Indianapolis	1 50
Second, S. Johnson	1 00
Painting on silk or satin, Mrs. J. H. Spence, Covington, Ind	1 50
Second, Mabel Hunter	1 00
Painting on wood, Daisy Waggaman, Kokomo, Ind	1 50
Second, Mabel Hunter	1 00
Flower painting, Mrs. J. H. Spence, Covington, Ind	1 50
Second, Flossie Smith, Indianapolis	1 00
Study, Still Life, Cornelia Warner, Crawfordsville, Ind	1 50
Second, Flossie Smith, Indianapolis	1 00
Drawing, original, Goldie Waggaman, Kokomo, Ind	1 50
Second, Daisy Waggaman, Kokomo, Ind	1 00
Drawing, copy, Mrs. H. E. Summers, Irvington	1 50
Second, Cornelia Warner, Crawfordsville, Ind	1 00
Crayon drawing, display, Goldie Waggaman, Kokomo, Ind	2 00
Crayon drawing, spec., Goldie Waggaman, Kokomo, Ind	1 50
Second, Cornelia Warner, Crawfordsville, Ind	1 00
Modelling in clay, Miss Mira Hutchinson, Flint, Mich	1 50
Wood carving, Daisy Waggaman, Kokomo, Ind	1 50
Second, Fred Dixon, Lawrence, Ind	1 00
Collection of woods, Goldie Waggaman	1 50
Second, Osie Cline, Greenwood, Ind	1 00
Minerals, collection, Geo. Higgins, Indianapolis	3 00
Collection of curiosities, S. Johnson, Irvington, Ind	2 00
Second, Geo. Higgins, Indianapolis	1 50
Collection of old coins, S. Johnson, Irvington	2 00
Collection of old stamps, S. Johnson, Irvington	3 00
Second, Miss Mira Hutchinson, Flint, Mich.	1 50

CLASS LVII—Geology and Natural History.

Collection of Indiana fossils, W. S. Blatchley, Indianapolis.	\$5 00
Collection of pre-historic remains, W. S. Blatchley, Indianapolis	5 00
Collection of clays, W. S. Blatchley, Indianapolis	5 00
Collection of shells, W. S. Blatchley, Indianapolis	5 00
Collection of woods, W. S. Blatchley, Indianapolis	5 00
Butterflies or diurnal lepidoptera, W. S. Blatchley, Indianapolis	5 00
Collection grasshoppers, katydids, etc., W. S. Blatchley, Indianapolis	5 00
Collection birds beneficial to farmers, W. S. Blatchley, Indianapolis.	5 00
Collection of eggs, W. S. Blatchley, Indianapolis	5 00
Best collection of geology specimens, W. S. Blatchley, Indianapolis	10 00

Jas. Troop, Lafayette, Ind., Judge.

DEPARTMENT M.

MACHINERY.

W. W. STEVENS, Superintendent.

To the Indiana Delegate State Board of Agriculture :

The first work done in this department the past year was the surveying of the grounds, numbering of lots and the preparation of a sectional plat for convenience in assigning space, thus avoiding, as far as possible, confusion and contention among exhibitors. In this department there were 174 exhibitors to care for, but with the grounds platted, and a majority of the exhibitors assigned space prior to the week of the Fair, there was little trouble experienced in getting everything in place and everybody satisfied with their locations.

As long as the work of progress and improvement continues and new inventions are being brought out every year, the display of agricultural implements and machinery will prove to be one of the most attractive features of our State Fair, and it is gratifying as well, to know that it is the least expensive to the Fair management of all displays made upon the grounds. On the other hand, it is the most expensive to exhibitors, and we owe it to them to use every effort in our power to make their visit as pleasant and profitable as possible, and should extend to them every accommodation and favor we possibly can to win and retain their good will and patronage from year to year.

A combination among threshing-machine manufacturers to make no displays at fairs last season, kept much of this sort of machinery away, but there was a creditable exhibit of threshing outfits nevertheless, and the space thus left vacant by old exhibitors was utilized by assigning it to exhibits of other new machinery that proved to be equally as attractive, and the only losers by the combination were the men who staid away and persistently refused to contribute their part to make the machinery exhibit complete.

These annual fairs afford an opportunity for manufacturers to bring before the public the improved products of their factories, and this rivalry has resulted in furnishing the American farmer with the most highly-improved and best-finished implements in the world. Our fairs can not help but be of immense value to dealers in implements as well as manufacturers, for here they can compare the different lines of goods and decide which implements are best suited for their several localities. And the meeting of manufacturer and dealer is to the mutual advantage of both, for a free interchange of opinions is very necessary and results in the acquirement of knowledge that can not otherwise be obtained.

Every farmer that attends the Fair is also benefited by the exhibit, for they have little opportunity at home during the busy season to become familiar with

improved implements other than the ones used upon the farm. But valuable as are these exhibits of agricultural implements, much more interest would be created and more benefit derived if, instead of arranging them in sheds and tents to be simply looked at, they could be seen at actual work. Many an implement makes a good appearance at rest upon a floor, but when put to test falls far short of the claims made for it by glib-tongued agents.

Believing that, when it is at all possible, every implement exhibited should be seen in actual operation, so that its actual merits may be determined upon, I suggest that we grow the coming season on our grounds a few acres each of corn and potatoes for the purpose of testing machines in harvesting these crops. After the removal of the corn and potatoes, walking, sulky, gang and subsoil plows may be tested, and after these harrows, rollers, pulverizers, drills and planters of all kinds. Make our Fair in this particular a great educational feature, where farmers may see all kinds of implements necessary on the farm handled by experts in a scientific manner. And we might carry this matter still further by having farmers to compete one with the other in doing the different kinds of farm labor, to the end that the science of their calling might the more speedily become one of the fine arts. It is the business of the managers to make our State Fair a leader in all things that tend to elevate and ennoble the greatest of all vocations—agriculture—and at the same time raise to a higher standard those engaged in the calling.

I know there is a demand for the new feature as above suggested, among both exhibitors and farmers, and whatever we can do in any way, or in any department of this Fair, to please and interest both exhibitors and visitors will result in permanent good and the building up of our association.

The receipts in this department were \$26.00 for exhibitors' tickets. The expense for one helper, \$19.50.

DEPARTMENT N.

GRAND STAND.

MASON J. NIBLACK, Superintendent.

To the Indiana Delegate State Board of Agriculture.

The expenses of the Grand Stand were:

For ticket receivers and police.	\$63 60
For sweeping and cleaning	15 00
Total	<u>\$78 60</u>

No recommendations are made.

DEPARTMENT O.

REPORT OF SUPERINTENDENT OF PRIVILEGES.

V. K. OFFICER, Superintendent.

To the Indiana Delegate State Board of Agriculture :

MR. PRESIDENT AND GENTLEMEN—As Superintendent of Privileges, I beg leave to report that on account of the almost continuous rain which prevailed at the time of the Fair, the receipts for privileges were somewhat less than were promised at the opening. Quite a number of those that bought privileges were unable to pay in full because of the fact that they had no opportunity to sell sufficient to pay for the same.

The receipts for the privileges for the year are \$2,493.88; the expense of operating the department, \$134.80.

INDIANA FAIRS—OFFICERS FOR 1896.

NAME OF SOCIETY.	PRESIDENT.	ADDRESS.	SECRETARY.	ADDRESS.
INDIANA STATE FAIR	W. W. Hamilton	GREENSBURG	CHAS. F. KENNEDY	INDIANAPOLIS.
Benton and Warren	Henry Robertson	Boswell	W. H. McKnight	Boswell.
Bourbon Fair Association	Jacob Fritsch	Bourbon	J. W. Edison	Bourbon.
Bremen Agricultural Society	John Huff	Bremen	Henry W. Miller	Bremen.
Clay County Fair Association	W. H. Guhl	Clay City, Ind	John E. Travis	Clay City, Ind.
Clinton County Agricultural Society	Robert Carrick	Frankfort	Joseph Heavilon	Frankfort.
Couch to County Agricultural Association	A. E. Nowlin	Lawrenceburgh	J. B. Dorman	Lawrenceburgh.
Delaware County Agricultural Society	Wm. H. Wood	Muncie	M. S. Claypool	Muncie.
Dubois County Agricultural Association	E. K. Brundick	Huntingburg	Daniel Reutebohle	Huntingburg.
Eastern, Ind., Agricultural Association	Nathan Roberts	Kendallville	J. S. Conlogue	Kendallville.
Fountain, Warren and Vermillion Agr'l Ass'n	James Everly	Covington	W. T. Ward	Covington.
Gibson County Agricultural Association	John W. Johnson	Princeton	S. Vet Strain	Princeton.
Grant County Agricultural Association	Gen. Dicken	Marion	H. G. Hamaker	Marion.
Grange Jubilee Agricultural Association	D. P. Monroe	Levi	Thos. H. Watlington	Madison.
Hamilton County Agricultural Association	John S. Ketchival	Sheridan	N. W. Cowgill	Sheridan.
Henry County Agricultural Association	R. H. Cooper	Newcastle	J. O. Mendenhall	Newcastle.
Hancock County Agricultural Association	Chas. Downing	Greenfield	Elbert Tynar	Greenfield.
Harrison County Agricultural Association	J. Q. A. Seig	Corydon	Henry Wright	Corydon.
Hendricks County Agricultural Association	Jas. M. Barlow	Plainfield	John Morgan	Plainfield.
Jay County Agricultural Association	John Schmuck	Portland	Jas. T. Graves	Portland.
Jennings County Agricultural Association	T. W. Myres	North Vernon	Fred H. Nauer	North Vernon.
Jefferson County Agricultural Society	S. W. Dungan	Franklin	W. S. Young	Franklin.
Lake County Agricultural Society	Isaac Lyons	Vincennes	John Burke	Vincennes.
Lawrence County Agricultural Society	T. O. Doggy	Bedford	S. T. Tollman	Bedford.
Lake County Agricultural Society	E. H. Hixen	Crown Point	A. A. Bible	Crown Point.
Linn County Agricultural Society	W. C. Bush	Laporte	J. Vene Derland	Laporte.
Martin County Agricultural Society	M. J. Leisure	Leisure	D. G. Evans	Elwood.
Madison County Agricultural Society	C. C. Richards	Howland	Ida F. Richardson	Indianapolis.
Madison County Agricultural Society	A. S. Miller	Middletown	K. C. Wischart	Middletown.
Madison County Agricultural Society	W. N. Showers	Bloomington	C. R. Worrall	Bloomington.

INDIANA FAIRS—OFFICERS FOR 1896.—Continued.

NAME OF SOCIETY.	PRESIDENT.	ADDRESS.	SECRETARY.	ADDRESS.
Montgomery County Agricultural Society	M. B. Waugh	Crawfordsville	W. W. Morgan	Crawfordsville.
Morocco Agricultural Society	C. M. Hanzel	Morocco	A. E. Parkey	Morocco.
Northwestern Indiana Agricultural Society	R. W. Crooks	Waterloo	M. Kiplinger	Waterloo.
Notre Dame Agricultural Society	Orlando Kimmell	Kimmell	J. H. Hoffman	Ligonier.
Pike County Agricultural Society	Jas. S. McCoy	Petersburg	Sylvester Brock	Petersburg.
Putnam County Agricultural Society	J. C. Bridges	Bainbridge	A. R. Allison	Bainbridge.
Park County Agricultural Society	B. F. Sells	Bridgeton	F. M. Miller	Bridgeton.
Randolph County Agricultural Society	Thos. C. Mullen	Winchester	D. E. Hoffman	Winchester.
Rush County Agricultural Society	W. O. Walton	Rushville	W. L. King	Rushville.
Switzerland and Union County Agricultural Society	F. M. Miller	Laughery	W. H. Madison	East Enterprise.
Stevenson County Agricultural Society	Austin M. Parcell	Flint	H. L. Huston	Angola.
Shelby County Agricultural Society	John W. Vannoy	Shelbyville	E. E. Stroup	Shelbyville.
Spencer County Agricultural Society	J. C. Haines	Lake	P. C. Jolly	Chrisney.
South Bend Agricultural Society	Wm. O. Jackson	South Bend	A. W. Byers	South Bend.
Swazee Agricultural Society	G. W. McManiman	Point Isabel	S. C. King	Swazee.
Tipton County Agricultural Society	Cyrenus Johnson	Lafayette	Wm. M. Blackstock	Lafayette.
Vigo County Agricultural Society	W. P. Beauchamp	Terre Haute	W. H. Duncan	Terre Haute.
Union County Agricultural Society	A. E. Kitchell	Liberty	H. F. McMahon	Fairfield.
Warren County Agricultural Society	J. W. Beard	Warren	G. M. Fleming	Warren.
Washington County Agricultural Society	H. C. Hobbs	Maum	E. W. Menough	Maum.
Wayne County Agricultural Society	John Bonner	Hagerstown	F. H. Baldridge	Hagerstown.
Warren County Agricultural Society	W. H. Goodwine	West Lebanon	M. A. Judy	West Lebanon.

INDIANA FAIRS—NUMBER OF EXHIBITS, 1896.

SOCIETY.	Horses.	Mules.	Cattle.	Sheep.	Swine.	Poultry.	Mechanical.	Agricultural and Horticultural.	Fine Arts.	Miscellaneous.	Special.	Total.
Benton and Warren	128	15	15	15	71	117	20	313	1,359	113	90	2,221
Bourbon Fair Association	124		31	37	37	161		342	579	890	125	1,381
Bremen Agricultural Society	91		18	14	64	89		368	654	21	14	2,313
Clay County Fair Association	71	10	30	25	25	52	60	124	68	121	7	5,191
Clinton County Agricultural Society	177	6	76	18	143	557	41	304	886			2,338
Dearborn County Agricultural Society	146	10	25	27	28	73		142	654			1,105
Delaware County Agricultural Society	170	9	99	94	116	375	90	600	1,055			2,408
Dubois County Agricultural Society	322	28	111	56	65	104	26	272	841	871	81	2,777
Eastern Indiana Agricultural Society	96		142	130	129	320		925	2,820	125		4,688
Fountain, Warren and Vermilion Ag'l Soc	110	13	35	25	30	40	45	80	1,600			1,876
Gibson County Agricultural Society	210	20	100	50	150	100	75	600	2,500	375	50	4,230
Grant County Agricultural Society	111		54	11	36	152	12	433	624			1,433
Granger Jubilee Agricultural Society					5	5		75	10	5	4	104
Harvey County Agricultural Society	146	17	84	70	71	505		137	61			1,080
Hamilton County Agricultural Society												
Hancock County Agricultural Society	275	19	128	24	114	127		562	905			2,154
Harrison County Agricultural Society								36	85	100		227
Hendricks County Agricultural Society	228		135	162	169	214	30	1,165	1,482	671	100	4,351
Jay County Agricultural Society	34	15	100	25	64	50	60	115	800			1,363
Jennings County Agricultural Society												
Johnson County Agricultural Society	190		66	25	93	167	16	513	1,683			2,783
Knox County Agricultural Society	252	4	64	50	114			205	1,760	110		2,850
Lake County Agricultural Society	126		54	16	26	42	3	91	300			600
Laporte County Agricultural Society	74		49	13	14	91	21	96	371	169	58	958
Madison County Agricultural Society	240	190	63	141	101	165	21	529	664			2,134
Marion County Agricultural Society												
Madison County Agricultural Society	165	22	60	54	90	1,000	40	194	2,200	20	25	3,901
Monroe County Agricultural Society	65							175	500			740
Montgomery County Agricultural Society	420		120	162	126	400	35	620	1,217	382		3,576
Morgan County Agricultural Society	10					50	4	100	125			385

INDIANA FAIRS—PREMIUMS PAID IN 1896.

NAME OF SOCIETY.

NAME OF SOCIETY.	Horses.	Mules.	Cattle.	Sheep.	Swine.	Poultry.	Mechanical.	Agricultural and Horticultural.	Fine Arts.	Miscellaneous.	Special.	Total.
Benton and Warren Counties Agricultural Association	\$2,114 00	\$39 50	\$85 00	\$72 90	\$155 70	\$64 00	\$20 70	\$92 00	\$342 50	\$33 50	\$390 00	\$3,019 80
Bourbon Fair Association	91 40		71 56	43 65	56 70	70 00		80 00	126 65	59 15	75 00	1,519 35
Bremen Agricultural Society	98 20		21 75	20 91	37 58	33 25		6,220 00	117 20			535 28
Clay County Fair Association	879 50	13 50	56 50	66 00	41 50	64 50	12 00	47 00	60 50	78 50		1,319 50
Clinton County Agricultural Society	1,032 00	13 00	269 00	27 00	82 00	66 00	18 00	67 00	123 00	20 00	14 00	1,731 00
Dearborn County Agricultural Society	2,050 00	27 00	110 00	83 00	89 00	26 55		42 77	121 70			2,551 02
Delaware County Agricultural Society	2,682 00	30 00	502 00	225 00	245 00	145 00	100 00	245 00	287 00			4,461 00
Dubois County Agricultural Society												1,400 00
Eastern Ind. Agricultural Society	1,021 75		412 00	173 00	194 00	135 50		124 50	382 25	25 65		2,463 65
Fountain, Warren and Vermilion Counties Agricultural Society	375 60	50 00	95 00	75 00	90 00	30 00		90 00	320 00			1,135 00
Gibson County Agricultural Society	1,100 00	76 00	250 00	75 00	100 00	60 00	100 00	200 00	560 00	20 00	17 50	2,457 50
Grant County Agricultural Society	1,318 00		199 00	28 00	122 50	82 25	65 00	160 75	233 58			2,709 00
Orange, Dubois, Agricultural Society												None.
Henry County Agricultural Society	986 52	40 50	327 00	154 00	132 00	149 75		26 25	24 00			1,840 02
Hamilton County Agricultural Society												1,347 50
Hancock County Agricultural Society	1,220 00	82 00	328 00	126 00	210 00	65 50		180 00	240 85			3,432 92
Harrison County Agricultural Society												2,452 35
Hendricks County Agricultural Society	673 00		493 00	219 00	441 00	116 43	187 50	271 90	288 00	119 75	615 00	3,453 44
Jay County Agricultural Society												2,140 50
Jennings County Agricultural Society												
Johnson County Agricultural Society	1,316 05		257 50	89 50	252 00	106 85	70 00	126 80	341 00			3,062 70
Knox County Agricultural Society	763 48	7 50	115 00	52 90	72 00			100 50	132 25	110 00		1,353 63
Lawrence County Agricultural Society												2,000 00
Lake County Agricultural Society	1,214 80		223 25	42 00	58 00	30 00		26 50				1,586 61
Laporte County Agricultural Society	1,017 00		119 00	22 00	48 00	43 20	51 50	85 80	186 48			1,522 98

INDIANA FAIRS—PREMIUMS PAID IN 1896—Continued.

NAME OF SOCIETY.	Horses.	Mules.	Cattle.	Sheep.	Swine.	Poultry.	Mechanical.	Agricultural and Horticultural.	Fine Arts.	Miscellaneous.	Special.	Total.
Madison County Agricultural Society	\$2,420 00	\$45 00	\$312 00	\$215 00	\$225 00	\$85 50	\$49 00	\$191 00	\$252 75		\$539 50	\$4,335 75
Marietta County Agricultural Society												60 85
Martin County Agricultural Society	1,429 00	35 00	131 00	140 88	132 00	90 00	20 00	80 00	200 00	\$4 00	5 00	2,167 18
Madison County Agricultural Society	1,115 00							75 00	75 00		50 00	1,315 00
Montgomery County Agricultural Society	3,648 00		810 00	345 00	233 50	325 50	87 50	223 00	504 50	242 50		6,481 50
Montgomery County Agricultural Society	50 00					50 00	650 00	150 00	125 00			371 50
Northeastern Indiana Agricultural Society	560 00											540 00
Noble County Agricultural Society	760 20		125 50	30 50	49 50	51 00		23 07	118 80			1,158 57
Pike County Agricultural Society	697 00	9 00	4 00	10 00	60 00	20 00		73 25	137 50			1,021 75
Putnam County Agricultural Society	623 30	42 00	54 30	59 50	61 00	63 00		32 25	232 50			1,250 85
Putnam County Agricultural Society	484 00	27 00	52 20	58 80	93 00	72 23	9 00	27 00	147 20			1,654 05
Randolph County Agricultural Society	825 00		84 50	64 00	124 00	48 00	45 00	50 00	131 00	41 00	6 00	1,429 50
Rush County Agricultural Society	1,171 75	50 00	217 00	88 00	172 00	291 50	57 50	150 75	842 00	106 00	275 00	2,920 50
Switzerland and Ohio Counties Agricultural Society	781 00	57 00	112 50	48 00	78 00	33 00	57 75	97 25	205 50	23 00		1,498 00
Stearns County Agricultural Society	1,121 00		179 00	151 50	103 00	32 50	10 50	180 25	125 05			1,902 80
Shelby County Agricultural Society	3,375 52	62 00	320 00	132 00	186 00	246 00	99 00	107 00	340 00	9 00		4,876 52
Spencer County Agricultural Society	500 00	90 00	150 50	71 00	102 00	41 50		60 00	275 25	25 00	445 75	1,429 95
South Bend Agricultural Society												
Swazee Agricultural Society	182 32	10 45	69 75	25 02	62 15	49 76	14 85	57 32	81 96	242 00	21 00	816 50
Tippecanoe County Agricultural Society	3,679 00		480 00	180 00	240 00	240 00		200 00	300 00			5,400 00
Vigo County Agricultural Society								70 00				2,612 20
Union County Agricultural Society												70 00
Warren County Agricultural Society	1,300 50		296 50	137 00	153 50	113 00	106 00	146 25	181 75	141 25		2,577 75
Washington County Agricultural Society	515 50	24 00	49 00	17 00	33 50	12 50		50 50	130 00			832 00
Wayne County Agricultural Society	748 25		69 58	21 91	31 65	19 30	5 70	14 00	55 20			965 59
Warren County Agricultural Society	357 00	36 00	270 00	140 00	180 00	110 00		40 00	56 00			1,843 00

COUNTY AND DISTRICT REPORTS.

BOSWELL FAIR ASSOCIATION.

The farmers of Benton and Warren counties have this year been blessed with good crops. The wheat, oat and hay crops have been good, while the corn crop has been enormous—doubtless the largest ever produced in the two counties. The wheat and oat crops were badly damaged by heavy rains while in the shock. The hay crop was saved in fair condition and the corn was harvested in good condition and is of excellent quality. Potatoes and other root crops were very good, in fact, all vegetables have been abundant and of good quality. Fruits, except apples, were also plentiful. Of horses, there is still a large surplus in the two counties, many farmers having double the number needed for their own use, the supply being much larger than the demand. While some are being sold, yet prices are very low. Cattle are healthy and in good condition, and more than the usual number are being fattened for the markets. The hog crop has been bad, cholera being very prevalent—many farmers losing their entire crop, not even having enough for their own home consumption; others shipping their hogs very light to avoid the disease and save something from the wreck.

The low prices of grain and stock, except cattle, is having a very depressing effect on business in general, and the outlook for the future is not as bright as it could be.

CLINTON COUNTY FAIR ASSOCIATION.

The wheat crop, as to quality, was not up to the average this year, there being but very little No. 2 wheat, and, as a whole, was a very unsatisfactory crop. Corn was never better as to quality or quantity, many fields making 80 bushels per acre. The corn crop of Clinton County has been estimated at 1,000,000 bushels. Oats was splendid, with a large acreage sown, but owing to continued rains during harvest the crop was badly bleached and damaged. Rye was very good as to quality, but a little short on quantity, with an average acreage sown. The hay crop was very good, some meadows being mowed the second time; something unusual in this climate. Potatoes, cabbage and all other garden truck were very good this year. Apples, peaches, pears, and berries of all kinds, were very abundant this year. Farmers are, generally, short on all kinds of stock, except horses.

DELAWARE COUNTY AGRICULTURAL ASSOCIATION.

The year 1896 has been rather disastrous to farming interests in this county, for the most part. Seasonable rains produced a bountiful harvest of all the products of the farm and unfavorable rains destroyed them in the harvesting. A great portion of the wheat, oats and hay rotted in the field. The season was most favorable for corn. All classes of land produced large, solid corn, and there is the

greatest crop that has ever been raised in the county. Small fruits and vegetables have done well. In the matter of livestock there is but little that is new to report. Cholera has been prevalent in the county and the loss will probably reach 10,000 head, which is a great loss when corn is hardly worth hauling to market at present prices—16 cents per bushel. The sheep industry has received quite a stimulus from a recent sale in this county of 200 head at an average price of \$22.50 per head. The growing wheat does not look well at this time, December 31st, and the weather is not favorable for its improvement.

DEARBORN COUNTY AGRICULTURAL ASSOCIATION.

The year 1896 has been hard on the farmers of Dearborn County. Wheat was almost a total failure; hay, scarcely a half crop; oats, ruined in the field by rain and bugs; corn and potatoes being the only full crops raised, and they being so cheap that but little money is realized with which to pay expenses and taxes.

DECATUR COUNTY AGRICULTURAL ASSOCIATION.

The year of 1896 has not been what we hoped for. Financial depression and low prices of farm products have brought many of our fair associations low in finances—we are not an exception. We had a fine crop of corn; never better.

Wheat was not much to brag of—quality poor and quantity small.

We did not hold a fair in 1896; we thought it best to rest for a time, and now we think we did well.

Farmers are paying more attention to stock raising. Better cattle and hogs are looked after now than in the past. We can not say too much for the sheep. Better days are coming for the wool growers. I think the panic tornado has spent its force against the sheep.

GIBSON COUNTY AGRICULTURAL SOCIETY.

The farmers are feeling very intensely the depression of dull times and the low prices of their products, but it is generally conceded that their condition is better than many other occupations. Wheat was hardly a half crop, and what there was was of a very inferior grain, and the low prices did little towards encouraging the farmer to sow a large crop. The growing crop at the present is all that could be expected, and the acreage is fully as large as any former years. Our corn crop this year was about 75 per cent. of former crop, and is selling at fifteen cents per bushel, which does not put much money in circulation from this standpoint. Orchard fruit was about 75 per cent. of a crop. Live stock in our county has not had the attention it should, but still we class ourselves as at the head. Clover is our main fertilizer, and is used extensively by all farmers. Our coal interests are the best in the State. We have one mine here with a seven-foot vein, and in fine running shape. The output is sixty to seventy-five cars per day, and is very fine for coke. I think our mode of farming will be entirely changed in the

course of a few years. The Farmers' Institute is doing a grand work in the education of the farmer, but I hardly think the distribution of the State funds for this work is distributed as it should be. At the start, the appropriated funds were distributed all right, but now each county only gets a small share, and the balance is used up by sending speakers over the State. Give us the old way, and let each institute secure its own speakers.

GRANGE JUBILEE AND AGRICULTURAL ASSOCIATION.

The farmers of Jefferson County have reasons to be thankful for good crops. There has been a fair yield of almost all the various crops grown during the past year, but they can not say so much for the net proceeds of the fruits of their labor, as there is scarcely a crop grown that is paying the expense of production, and some fall far below the cost of production.

Wheat in this county was but little above a half crop, caused by the extreme drouth in the fall, the plant making a very poor growth, therefore was badly injured during the winter. Some fields made good yields, but they were few. The growing crop is looking much better than it did last year. The plant has made a fine growth this fall, and if the winter is favorable the prospects for a fair crop next year is very good. Acreage sown, full average.

The corn crop is good, the yield above an average. A large acreage grown.

Oats above an average yield, but quality light.

Barley about 60 per cent. of an average crop.

Potatoes above an average crop, but prices very low.

Sweet potatoes, full 30 per cent. above an average crop, prices low, a large acreage grown, most of them being housed for the winter and spring trade.

Onion sets, under an average yield, owing to frequent rains during the summer; a large per cent. are too large.

Apples, very light crop.

Peaches, the largest crop ever grown and of fine quality, but prices very low.

Small fruits a fair crop.

Owing to low prices and the depressed condition of trade in general the planting of fruit trees has fallen off during the past year.

Live stock interests in all its branches is at a standstill on account of low prices.

This county during the past year has taken the initiative step toward having free pikes. Two townships have voted to build four free gravel roads, which will result in the county buying all the toll roads in a few years.

The farmers' institute recently held was the best attended of any ever held in the county. The interest in these meetings is growing each year, and the educational influence is very perceptible. We would like to see the appropriation for farmers' institutes from the State increased this winter.

The manufacturing interest in Madison (our county town) has suffered from the general depression in business. Our farmers have felt very sorely the effect of the closing down of the large cannery this season, but prospects for the future are

growing brighter, for we have been assured that the cannery will run next season. With a general belief that all the manufactures that have been shut down, or running on reduced time, will resume next spring and employ a full force of hands, we feel assured that we will have better prices and more prosperous times during the coming year.

HENDRICKS COUNTY AGRICULTURAL ASSOCIATION.

Hendricks County can report a very prosperous year. Her crops were all good except wheat. Her meadows of timothy and clover were fair, while her corn fields were almost burdened with a great crop. Apples about an average in quantity, but more than an average in quality; a good crop of peaches wherever there were trees. Plums, cherries and all small fruits were in abundance. The growing wheat appears tender from excessive autumn rains, and warm weather causing a quick growth so tender as to be easily affected by the frosts, and it is feared that much of it is injured. The condition of our people is fairly prosperous. We have suffered very little from disease among the stock, except hog cholera among the swine. Vast herds of these have been swept away, very frequently after they were fatted for market. Much attention has been given to roads, and some townships in our county have not a foot of bad road in them. There has been a large export of horses. The large number of horses going out of the county every week will finally drain the county of all good ones, and will leave the county with only mongrels to breed from. Although the prices have ranged low, yet good ones have brought good prices in many cases, when the good breeding added to their other good qualities speed and knee action. Farmers have been compelled, on account of the low price of grain and other produce, to sell their best mares and keep the inferior ones; or, in other words, to sell whatever would sell for money, regardless of the future. There is also quite a growing dairy business, and the interest seems to be increasing. Shipping milk, butter and cheese is a growing industry, which steadily fills the pockets and enriches the land. Silos are becoming numerous, making feed cheaper and of a better quality.

KNOX COUNTY AGRICULTURAL ASSOCIATION.

The condition of agriculture in this county for the past year has not been very flattering owing to a large shortage of the wheat crop. The crop did not average over ten bushels to the acre. The corn crop, however, is an average, but the extreme low prices make it seem insignificant.

The hay crops, both of timothy and clover, were good, but the clover seed crop was very poor.

Hogs are about 40 per cent. short of an average in number, sheep 30 per cent. and cattle 20 per cent.

The apple and peach crops were an average. Small fruits were in unusual abundance.

The wheat acreage is an average, but its condition is not promising owing to zero weather in November, while the wheat was unusually tender and rank. Up to the time of the freeze the wheat was more promising than it had been for many years. The local price for wheat at this writing is from 80 to 85 cents per bushel.

LAKE COUNTY AGRICULTURAL SOCIETY.

The past year has been an unusually fruitful one to the agricultural interests of Lake County, retrieving in a great measure the misfortunes of the two preceding years. The increase in acreage, as well as in average yield per acre, has been greater, and in some instances a very noticeable progress has been made in the methods of planting, tilling and harvesting. Corn averaged about fifty bushels per acre on well drained land where the wet early in the season could not interfere with its growth. Oats and wheat were a fair crop, yielding in the neighborhood of 35 and 25 bushels each per acre. The rain interfered seriously with the harvesting of these crops, many fields being wholly ruined and others badly damaged.

Hay, which can well be said to be the main agricultural product of this portion of the State, averaged from one to one and three-fourths tons per acre for the best timothy. The wild and marsh hay was very poor. Fruits of all kinds yielded abundantly. It is believed by good authority that the soil in a portion of Lake County is well adapted to the raising of sugar beets, although no practical test has been made. An effort will be made the coming year to try the experiment and ascertain, if possible, the exact per cent. of saccharine in beets grown upon the soil in the central portion of the county. If it is found that a crop of this kind can be grown of a sufficient quality to make it profitable, it will open up an industry of wonderful importance to the northern portion of the State.

Dairying is receiving, at present, the most attention from the farmer, and is proving the most remunerative of all the various industries allied to agriculture. Vast quantities of milk are daily shipped to Chicago dealers for city consumption, and several creameries are paying handsome profits to their managers. A number of herds of fine cattle can be found in Lake County. Of these, the herds of Conrad Jergens, Crown Point; S. B. Woods, Lottaville; J. N. Beckman, Brunswick; Leo Davis, Dyer; Wm. Michael, Lowell, and C. B. Benjamin, Leroy, are especially notable.

MONTGOMERY COUNTY AGRICULTURAL SOCIETY.

The crops in this county the past year were, taken as a whole, hardly up to the standard, as the wheat crop was practically a failure. The oats were good, but owing to the wet weather, a great many acres were ruined while yet in the shock. Grasses, both timothy and clover, were about an average, while potatoes would not equal an average crop. Corn was the only one product of the farm that could be classed as a full crop, as the yield this year will probably equal that of any year in the history of the county.

MARION COUNTY AGRICULTURAL SOCIETY.

The season having had abundant rains, the yield has been effected in both ways. Oats were fine, but injured in the shock by heavy rains before they could be stacked or threshed. Hay suffered from the same cause. Wheat was not an average crop, and was hurt by the fly. The price advanced at the latter part of the season. Corn abundant, of good quality, but price very low. Tomatoes yielded well, but canneries did not take the full yield, claiming to be overstocked. Garden truck, of good quality but very cheap. Fruits yielded well but not as abundantly as last year.

No snows up to this date that covered the ground. Winter wheat appears to have been hurt by the wet and frost.

The County Farmers' Institute, held at Southport, was well attended and much interest manifested.

The time of the annual election of officers has been changed to January instead of March, so that one annual report will answer for the county society and the State Board of Agriculture.

PARKE COUNTY AGRICULTURAL SOCIETY.

The corn crop was the best for many years, but the price is very cheap, selling at 16 cents. A very light yield of wheat thrashed. The present crop damaged by the early freeze. Light crop of hogs, owing to the cholera; selling gross weight, \$3 per hundred. Quite a good demand for feeding cattle. Horses selling very cheap; not many being bred.

SHELBY COUNTY AGRICULTURAL ASSOCIATION.

Our wheat crop was above the average, but with the ruling prices its returns were not satisfactory. Corn was an abundant crop; but what can be said about the price? A roost of a dozen old hens, of whatever kind, will profit a farmer more than many acres of corn. The confidence we have in the future, however, stimulates us to believe that better times are in store for us.

The yield of hay was fair and the quality good. Our farmers still continue to give their attention to the raising of clover seed, which yields them an abundant harvest.

Gardening and small fruit is engaging the attention of many of our farmers, and the past summer with its seasonable rains has encouraged many to divert their attention from more extensive farming to truck-patch gardening.

The farmers' institute has become one of the prominent fixtures of our county. It is looked forward to by our best farmers as a season of refreshment and profit. The one held December 11 and 12 was one of our most profitable meetings, and our farmers are more than ever before realizing and appreciating the benefits arising from the institute.

As an educator the Fair Association is far superior to all others. It is here that the farmers vie with each other in the result of their toil, and it is only here that the result of their labor can be fairly estimated. We regret that more farmers do not avail themselves of the opportunities and profits of this competition.

SWITZERLAND AND OHIO COUNTIES AGRICULTURAL SOCIETY.

As regards the condition of agriculture in Switzerland and Ohio counties, we have little to say. We adopt the saying of the wise man: "There is nothing new under the sun." The general conditions that prevail elsewhere are here also, and it is needless to say that agriculture is greatly depressed. Primarily this may be caused by the stagnation in other lines of business, manufactures, mining and commerce, but the apparent and immediate cause would seem to be the prevailing low prices of all farm products. This, with us, is coupled with the partial failure of some of our crops the past season, notably the wheat crop, which was the worst failure we ever had of that cereal. The severe drought of the fall of 1895 gave it little chance to get rooted, and the severe freezing of the following winter nearly finished it. What was grown was damaged by wet weather soon after harvest. The same cause that cut the wheat crop short also injured the clover and timothy meadows, which were badly killed out, and the yield light. The oat crop was good, but somewhat damaged by rains. The corn crop was perhaps the largest and best ever raised in the district. The tobacco crop, also, both in quantity and quality. Potatoes were good; not so many raised as formerly. No satisfactory market for them. Fruits of all kinds were abundant. Peaches were marketed at 40 to 50 cents per bushel, and thousands of bushels went to waste. A large part of the apple crop was also lost. Winter apples not keeping well; weather too warm. There has been considerable improvement of late in roads. Some twenty or twenty-five miles of free pike and gravel roads have been built in these counties the last year, and more roads are projected. There can be no question about the benefit of good roads to the farmer, but the building of them necessitates higher taxes, which many find burdensome these times. There is in our country an abundance of feed for stock, especially coarse feed. Some of our farmers are using the corn shucker and shredder. They say the fodder goes twice as far, as stock eat it all, and when shredded and baled it sells for \$6.00 per ton in some of our towns. Though hogs have declined in price, yet there is a good demand for pigs and shoats. Many prefer to feed their corn rather than sell at 18 or 20 cents. It is an old saying that "If wishes were horses, beggars would ride." We don't see why they should not all be mounted soon, for that is about all a horse costs now. In conclusion, we have to say that some of our farmers are fairly prosperous. Others find it difficult to make the two ends meet. Of course this latter class think that somebody else is at fault, and things are radically wrong, and that they are not in any sense responsible for existing conditions. We observe that nearly all of our farmers are industrious and economical. We know from an experimental knowledge that it requires a good deal of muscle to carry on the farming business; that when engaged in farming, the man that simply goes in on his

muscle, and makes no use of brain power, like the woodpecker, is pretty sure to come out of the same hole that he went in at. We believe that more thought and more planning will pay the farmer as well as the men engaged in other avocations.

WASHINGTON COUNTY AGRICULTURAL ASSOCIATION.

Our crops this year were fair to good; corn and oats especially were good; wheat about one half crop; but very little rye and barley sown. Our fruit crop was excellent, except the apple crop, which was not so large as last year. We are now contemplating making decided improvements and repairs on our grounds, as soon as spring opens.

We are looking forward to next year's exhibition to be the greatest and most successful of any since its organization.

WAYNE COUNTY AGRICULTURAL AND HORTICULTURAL SOCIETY.

Generally speaking, the past year has been one of prosperity rather than adversity, as granaries and barns were mostly filled with grains and feeds, cellars with tubers and vegetables and culinary departments with natural and canned fruits.

The agriculturist has had a reasonably seasonable year for farm operations throughout this section of the country, and feels that aside from the subject of finances, his adversities are not uncommon with those of other years.

The severe freezes of last winter's weather enabled the farmer to better prepare his soil for the year's cultivation. Fields planted to corn were seasonably prepared and seeded under fair conditions; the advocates of growing the white variety of corn predominating. With frequent, shallow, level cultivation, the stalks attained a wonderful growth, and the yield of fodder and grain was enormous. The crop was cut, husked and removed from the land in excellent condition, and buildings have been found inadequate to store the products. Impromptu bins and rail pens are not unfrequently seen while traversing the rural districts, entirely filled with corn of excellent quality, which will undoubtedly remain in store, consequent to better prices. The acreage of this important crop the past year was slightly above an average. The sowing of rye in the fall, incidentally furnishing grazing during the winter and spring months for live stock, has been found invaluable to the corn crop when turned under as a fertilizer.

Ensilage as a succulent food for stock for the farmer and dairyman is receiving careful consideration, especially for winter use, which will undoubtedly result in the construction of additional silos. Through the uncertainty of securing, in the last few years, a good stand of clover and timothy as the grass crops in rotative farming, millet has taken their places by satisfactorily yielding an abundance of fine hay and often a wonderful amount of seed.

The advent of the creameries throughout many sections of the country was a boon to the farmer, but as several have recently suspended operations, the housewife must necessarily return to old-time methods of butter-making. This caused

discontent, resulting in crowding of surplus milch cows on the market. The absence of surplus beef cattle in many localities and the immense loss through cholera of hogs, in southern and central Wayne County, are serious obstacles confronting the farmer at present, with such an abundance of feed at hand.

The comparative scarcity of sheep throughout the country is undoubtedly due to adverse legislation, and no change is expected so long as present conditions continue.

FRUITS.—The past year was unsatisfactory in many respects for fruits. The trees and vines apparently were in fine condition at the beginning of the year and with a profusion of bloom a large crop was apparently assured. Incomplete pollenization, followed by the severe ravages of insects, accounted largely for the unsatisfactory yield, especially the case with apples. A few trees of the summer varieties were liberally laden, several furnishing apples during the autumn, but many of the best fruit growers in this section were almost without any winter fruit, excepting some Indiana favorites, winesaps and black apples. As a result of such conditions, thousands of bushels have been shipped to the Richmond market, finding ready sales, but not with extravagant prices.

The importance of intelligent spraying with poisonous solutions is apparent, and the results are almost invariably satisfactory, especially with the cherry, plum, gooseberry and grape.

The peach crop was by far inadequate to supply the demand, although many individual trees in protected places were heavily laden with fine fruit.

The importance of plenty of bearing pear trees can not be denied, as lovers of this delicious fruit find, through the great number of existing varieties, good eating throughout the major portion of the year.

The universal sale of plums for canning purposes is wonderful, and a great incentive exists to propagate many varieties to meet the demand. The dreaded scourge, the black knot, still exists in disastrous proportions, especially on the Damson varieties.

The liability of the cherry to the attack of worms is well known, and efforts are being made to check its ravages on the earlier kinds, as they are most affected. The past crop was below an average.

A large crop of fine raspberries and blackberries were gathered, the season being especially favorable for their development. The practical utility of growing the dewberry is not fully demonstrated, although it has several enthusiastic advocates.

Currants and gooseberries received their share of attention, as this season's large yield indicated.

The season being somewhat advanced, strawberries ripened about two weeks earlier, but with a yield below normal. The quality was excellent and met with ready, satisfactory sales.

The universality of grape-growing in the city and on the farm is realized, and with such an abundance of luscious fruit as was grown during last year, every one had ample opportunity to individually taste and determine the characteristics of the various varieties grown.

The practice of sacking bunches is recommended, as it not only adds to the quality of the grapes, but lessens the liability of attack of mildew, rot, birds and bud insects.

FLOWERS. The ornamentation of the house and its surroundings appears to become more general, especially through the rural districts, as here, more contentment and happiness is usually necessary. Climatic conditions were especially favorable to the healthy development of plants, woody shrubs and vines, and the amateur florist was often abundantly rewarded by beautiful foliage and a profusion of bloom. Chrysanthemums did not receive the attention this year that was accorded them last.

VEGETABLES. The enormous yield of vegetables and their excellent condition on the market was unusual. From the advent of lettuce and radishes in early spring to the disappearance of late cabbages in the fall the dining-room table was constantly supplied with choice, seasonable vegetables. The annual consumption of melons is believed to be gradually increasing. Home production has been found inadequate to supply the demand, although truck farming enters largely in the occupation of those living near the cities.

FARMERS' INSTITUTES. For several years Hoosiers have witnessed the progress of farmers' institutes in other states, and are eminently satisfied with those held annually within our borders. The great interest and importance to the farmer of such organizations can not be denied, and the results have reached beyond the most sanguine expectations. Through their instruction a new era has dawned upon the life of our countryman, and by close observation and practice, assisted by the resources of science, he is thereby enabled to understand the underlying principles of successful farming, compare intelligently the results of practical experiments and broaden his knowledge on rural subjects, better assuring contentment and happiness of the home and the edification of his calling throughout the land.

CEREAL AND ROOT CROP STATISTICS FOR 1896.

COMPILED BY SIMEON J. THOMPSON, CHIEF OF STATE BUREAU OF STATISTICS FOR INDIANA.

WHEAT.

The yield of Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1896.	24,574,853	2,852,230	8 5
1895.	22,674,101	2,728,210	8.03
1894.	50,792,620	2,540,424	19.56
1893.	38,114,708	2,550,014	14.87
1892.	42,126,144	2,654,645	15.86
1891.	58,305,796	2,891,922	20.09
1890.	28,352,346	2,821,129	10.5
1889.	41,541,570	2,773,883	14.9
1888.	28,750,764	2,726,111	10.5
1887.	39,096,657	2,794,196	13.9

The greatest producing counties for 1896:

COUNTY.	Bushels.	Bushels per Acre.
Gibson	829,162	11.5
Posey	724,207	11
Knox	519,720	10
St. Joseph	502,066	11
Warrick	486,360	10

Greatest average yield per acre:

COUNTY.	Acres Sown.	Bushels per Acre.
Lake	3,481	12

CORN.

The yield in Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels Per Acre.
1896	148,578,898	4,005,690	37.09
1895	132,105,983	3,706,146	35.37
1894	95,205,132	3,526,116	27
1893	84,045,722	3,488,822	24.09
1892	111,217,463	3,563,337	31.2
1891	125,092,649	3,637,927	34.33
1890	87,092,513	3,446,459	25.2
1889	106,542,161	3,418,051	31
1888	128,436,284	3,419,377	37.5
1887	70,017,604	3,239,914	21.6

The greatest producing counties for 1896:

COUNTY.	Bushels.	Yield Per Acre.
Benton	4,465,036	46
Tippecanoe	4,433,194	38
Montgomery	3,805,797	43
Madison	3,010,430	43
Rush	2,953,713	43

Greatest average yield per acre:

COUNTY.	Acres.	Bushels Per Acre.
Delaware	55,496	49

OATS.

The yield in Indiana compared for ten years :

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1896.	23,689,234	1,180,057	20.07
1895.	24,601,831	1,098,700	22.5
1894.	38,236,019	1,202,422	31.8
1893.	32,015,229	1,206,301	26 54
1892.	27,369,719	1,103,958	24.72
1891.	23,123,189	897,952	25.75
1890.	15,556,207	1,119,398	13.2
1889.	28,710,935	950,231	30.2
1888.	27,493,851	937,143	29.8
1887.	24,378,984	886,927	27.7

The greatest producing counties for 1896 :

COUNTY.	Bushels.	Yield per Acre.
Benton	2,005,855	31—
White	804,536	19—
Warren	777,984	24
Newton.	765,774	18
Jasper	770,400	20

Greatest average yield per acre:

COUNTY.	Acres.	Bushels per Acre.
Wabash	16,073	33—

BARLEY.

The yield in Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1896	296,914	16,045	18.5
1895	659,058	32,222	19.8
1894	255,134	10,738	23.76
1893	214,544	10,621	20.2
1892	231,842	10,810	21.44
1891	467,773	21,388	21.87
1890	387,802	22,745	17
1889	416,325	19,825	21
1888	403,515	18,913	21.3
1887	340,663	17,311	18.5

The greatest producing counties for 1896 :

COUNTY.	Bushels.	Yield per Acre.
Randolph	45,360	35
Hancock	23,606	22
Henry	19,712	22
Jefferson	16,325	25
Franklin	16,093	19

Greatest average yield per acre :

COUNTY.	Acres.	Bushels per Acre.
Shelby	278	36

RYE.

The yield in Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1896	4,082,800	369,409	11.05
1895	1,972,190	148,899	13.2
1894	1,147,037	59,835	19.17
1893	875,949	59,751	14.66
1892	927,843	62,976	14.73
1891	808,148	44,845	18.2
1890	784,191	58,785	13.3
1889	871,216	54,451	16
1888	545,425	35,497	15.8
1887	450,750	33,871	13.6

The greatest producing counties for 1896:

COUNTY.	Bushels.	Bushels per Acre.
Elkhart	213,170	10
Clinton	148,512	13
Marshall	144,248	13
St. Joseph	142,417	11
Miami	140,190	15

Greatest average yield per acre:

COUNTY.	Acres.	Bushels per Acre.
Hancock	3,468	16

CLOVER HAY.

The yield in Indiana compared for ten years:

YEAR.	Tons.	Acres.	Average Tons per Acre.
1896	1,006,901	713,555	1.41
1895	1,185,267	1,098,642	1.08
1894	1,672,553	1,087,373	1.54
1893	1,793,768	1,087,132	1.65
1892	1,910,852	1,174,341	1.62
1891	2,109,814	1,208,672	1.75
1890	2,057,188	1,196,040	1.7
1889	2,349,528	1,174,764	2
1888	1,311,450	1,061,846	1.2
1887	1,728,776	1,121,314	1.5

The greatest producing counties for 1896 :

COUNTY.	Tons.	Tons per Acre.
Gibson	46,655	1.80
Sullivan	40,491	1.60
Knox	38,955	1.70
Montgomery	34,190	2
Clinton	31,396	1.85

TIMOTHY HAY.

The yield in Indiana compared for ten years:

YEAR.	Tons.	Acres.	Average Tons per Acre.
1896	1,650,252	1,243,969	1.32
1895	1,003,788	1,451,272	.62
1894	1,644,509	1,133,228	1.46
1893	1,580,269	1,128,764	1.4
1892	1,814,885	1,209,890	1.5
1891	2,034,242	1,257,758	1.6
1890	2,112,467	1,242,622	1.7
1889	1,823,047	1,215,365	1.5
1888	1,548,888	1,237,417	1.2
1887	1,543,558	1,269,870	1.2

The greatest producing counties for 1896:

COUNTY.	Tons.	Tons per Acre
Allen	49,715	1.37
Lake	49,356	1.35
Porter	24,438	1.35
Montgomery	33,398	1.80
Huntington	31,003	1.60

IRISH POTATOES.

The yield in Indiana compared for ten years:

YEAR.	Bushels.	Acres.	Average Bushels per Acre.
1896.	7,107,809	102,425	69.39
1895.	5,838,857	91,502	64
1894.	5,899,676	96,716	61
1893.	4,172,166	94,642	44.2
1892.	4,620,647	87,670	52.7
1891.	7,888,701	85,921	91
1890.	2,688,875	80,747	33.3
1889.	7,783,267	79,213	98.2
1888.	5,480,960	76,148	71.9
1887.	2,216,130	77,306	28 6

The greatest producing counties in 1896:

COUNTIES.	Bushels.	Bushels per Acre.
Allen	257,398	63
Marion.	249,480	81
Spencer	245,014	37
Stauben	178,496	118
Switzerland	171,808	118

Greatest average yield per acre:

COUNTY.	Acres.	Yield.
Grant	1,084	134

TOBACCO.

The yield in Indiana compared since 1889 :

YEAR.	Pounds.	Acres.	Pounds. per Acre.
1896	5,117,540	6,975	735
1895	10,179,500	9,578	1,211
1894	8,935,862	13,479	678
1893	8,650,960	12,722	.
1892	11,074,211	13,574	725½
1891	10,720,828	13,818	775½
1889	11,203,371	13,739	815½

The greatest producing counties in 1896 :

COUNTY.	Poun's.	Acres.	Pounds. per Acre.
Switzerland	2,192,300	2,427	900
Jefferson	791,700	1,092	225
Spencer	664,275	1,563	425
Warrick	377,600	472	800
Ohio	248,460	207	1,200

Greatest average yield per acre :

COUNTY.	Acres.	Yield in Pounds.
Ohio	207	1,200

WHEAT, 1896.

TABLE No. 1.

Statement Showing by Counties the Acreage of Wheat in 1896, the Acreage Yield per acre and Total Product in Bushels ; Also the Average and Product in 1895.

COUNTIES.	Acreage in 1896.	Yield per Acre.	Product in Bushels in 1896.	Acreage in 1895.	Yield per Acre	Product in Bushels in 1895.
Adams	29,246	10	292,460	27,501	10	275,010
Allen	45,434	8	363,472	41,103	12	493,236
Bartholomew	46,457	9.5	441,341	43,777	10	437,770
Benton	1,092	9	9,824	1,102	8	8,816
Blackford	12,883	8	103,064	11,583	8	92,654
Boone	42,436	6	254,616	41,788	5	208,940
Brown	13,269	7	92,883	12,684	5	63,420
Carroll	38,615	7	270,305	30,042	7	210,291
Cass	50,056	7	350,392	46,857	7	327,999
Clark	18,837	6	113,022	16,032	12	192,384
Clay	18,561	9	167,049	16,779	7	117,453
Clinton	46,407	7	324,849	46,620	5	233,100
Crawford	14,817	5.5	81,494	13,851	8	100,808
Daviess	44,136	7.5	331,020	47,438	8	379,504
Dearborn	19,351	6	116,106	17,174	8	137,392
Decatur	34,745	8	277,960	32,943	6	179,658
Dekalb	30,995	8	247,960	28,525	12	342,300
Delaware	33,338	8.5	283,373	31,178	6	187,068
Dubois	31,724	9	285,516	33,145	8	265,160
Elkhart	44,614	10	446,140	42,274	9	380,466
Fayette	23,124	11	254,364	21,964	10	219,640
Floyd	5,478	7	38,346	5,997	9	53,973
Fountain	34,000	10	340,000	31,766	7	222,362
Franklin	28,545	10	285,450	28,236	8	225,888
Fulton	42,398	7.5	317,985	39,491	8	315,928
Gibson	72,101	11.5	829,162	67,126	12	805,516
Grant	38,147	7	267,029	36,162	7	253,134
Greene	25,642	7	179,494	19,249	7	104,743
Hamilton	38,242	7	267,694	35,521	7	248,647
Hancock	30,003	6	180,018	31,153	7	218,071
Harrison	36,213	9	325,917	34,716	10	347,160
Hendricks	33,460	9	301,320	32,505	10	325,050
Henry	40,711	6	244,266	41,075	7	287,525
Howard	35,141	7	245,987	33,652	7	235,564
Huntington	38,465	10	384,650	36,692	12	440,304
Jackson	32,127	9	289,143	29,772	8	238,176
Jasper	7,888	9	70,992	5,162	9	46,476
Jay	31,575	8.5	268,388	30,908	7	216,358
Jefferson	18,677	9	168,093	16,216	11	178,376
Jennings	18,350	6.5	119,275	15,644	6	93,864

TABLE No. 1—Continued.

COUNTIES.	Acreage in 1896.	Yield per Acre	Product in Bushels in 1896.	Acreage in 1895.	Yield per Acre.	Product in Bushels in 1895.
Johnson	36,232	10	362,320	34,837	8	279,496
Knox	51,972	10	519,720	47,925	9	431,325
Kosciusko	54,805	7	383,635	49,389	7	345,373
Lagrange	37,744	11	415,184	34,702	12	416,424
Lake	3,481	12	41,772	2,863	10	28,630
Laporte	43,915	10	439,150	41,888	8	335,104
Lawrence	18,064	9	162,576	19,109	9	171,981
Madison	44,301	6	265,806	42,975	5	214,875
Marion	33,466	7	234,262	32,773	5	163,865
Marshall	45,993	8.5	390,941	43,487	8	347,896
Martin	15,524	7	108,668	16,117	7	112,819
Miami	45,481	6.5	295,627	43,398	8	347,184
Monroe	14,550	9	130,950	12,835	8	102,680
Montgomery	47,755	7.5	358,162	54,613	6	327,678
Morgan	25,303	9	227,727	22,384	7	159,689
Newton	1,681	10	16,810	1,714	11	18,854
Noble	44,863	10	448,630	40,865	9	367,785
Ohio	6,584	7	46,088	5,499	7	38,493
Orange	19,618	9	176,562	20,515	8	164,120
Owen	15,443	6	92,658	14,243	6	85,458
Parke	31,810	9.5	302,195	32,773	8	262,184
Perry	18,870	10	188,700	16,055	15	240,825
Pike	34,660	10	346,600	35,710	8	285,680
Porter	14,399	9	129,591	12,021	8	96,168
Posey	65,837	11	724,207	64,468	10	644,680
Pulaski	22,457	8	179,656	21,984	12	263,808
Putnam	26,027	7	182,189	24,968	7	174,776
Randolph	41,564	7	311,948	46,602	9	419,418
Ripley	24,321	7.5	182,408	21,519	7	150,633
Rush	50,506	9	454,554	46,670	8	373,360
Scott	12,958	6	77,748	10,272	8	82,176
Shelby	54,179	8.5	460,521	51,293	6	307,758
Spencer	39,403	10	394,030	36,118	9	325,062
Starke	5,272	9	47,448	5,514	9	49,626
Steuben	31,095	8	248,760	30,789	10	307,890
St. Joseph	45,642	11	502,062	42,348	9	381,132
Sullivan	36,483	9.5	346,588	34,611	8	276,888
Switzerland	12,537	8	100,296	10,824	8	86,592
Tippecanoe	40,727	11	447,997	36,180	9	325,650
Tipson	25,281	8	202,248	24,479	6	146,874
Union	19,172	10	191,720	17,701	9	159,309
Vanderburgh	30,729	11	338,019	28,876	12	346,512
Vermillion	23,853	11	262,383	23,496	11	258,456
Vigo	32,390	11	356,290	32,024	9	288,216
Wabash	44,050	6.5	286,325	42,926	9	386,334
Warren	17,429	10	174,290	17,184	7	120,288
Warrick	48,636	10	486,360	47,016	9	423,144
Washington	22,184	9	199,656	21,885	8	175,080
Wayne	41,349	10	413,490	40,240	9	363,060
Wells	32,395	9	291,555	29,495	9	265,455
White	28,658	7	200,606	27,684	10	276,840
Whitley	30,268	6.5	196,742	26,779	8	214,232
Total	2,852,230	. . .	24,574,853	2,718,188	. . .	22,648,001
Average . . . . .	. . . . .	8.5	. . . . .	. . . . .	8.3	. . . . .

CORN, 1896.

TABLE No. 2.

Statement Showing by Counties the Acreage of Corn in 1896, the Average Yield per Acre, and Total Product in Bushels; Also the Acreage and Product in 1895.

COUNTIES.	Acreage in 1896.	Yield per Acre.	Product in Bushels in 1896.	Acreage in 1895.	Yield per Acre.	Product in Bushels in 1895.
Adams	34,114	41	1,398,674	33,251	37.5	1,246,912
Allen	47,943	36	1,725,948	47,440	41	1,945,040
Bartholomew	51,778	36	1,864,008	60,789	32	1,945,248
Benton	97,066	46	4,465,036	88,658	34	3,014,272
Blackford	19,772	39	771,108	17,074	35	597,590
Boone	70,967	34	2,412,878	63,747	43	2,741,121
Brown	16,155	30	484,650	13,053	33	430,749
Carroll	52,034	45	2,341,530	57,308	36	2,063,088
Cass	52,127	41	2,137,207	50,122	37	1,854,514
Clark	28,861	28	808,108	29,221	32	935,072
Clay	37,498	31	1,162,438	30,021	37	1,110,777
Clinton	65,982	43	2,837,226	64,040	34.7	2,222,188
Crawford	17,488	19	332,272	13,809	30	414,270
Davies	60,411	31	1,872,741	55,534	36	1,999,224
Dearborn	18,881	40	755,240	19,300	32	517,600
Decatur	44,989	40	1,799,560	40,340	32.6	1,315,084
Dekalb	24,292	33	801,636	25,372	35.5	900,706
Delaware	55,496	49	2,719,304	45,229	29	1,311,641
Dubois	22,551	22	496,122	25,850	37	956,450
Elkhart	34,728	39	1,354,392	37,379	40	1,495,160
Fayette	28,178	38	1,070,764	26,587	29	771,023
Floyd	9,104	30	273,120	8,371	35	292,985
Fountain	54,730	38	2,079,740	50,751	35.5	1,801,660
Franklin	34,328	39	1,338,792	33,701	27	909,927
Fulton	41,236	40	1,649,440	38,995	35	1,364,825
Gibson	51,128	29	1,482,712	57,241	45.5	2,604,465
Grant	53,120	49	2,602,880	54,543	32	1,745,376
Greene	57,349	32	1,835,168	52,991	33.7	2,050,751
Hamilton	64,000	44	2,816,000	58,098	34	1,975,332
Hancock	46,641	41	1,912,281	41,357	38	1,685,566
Harrison	35,738	21	750,498	37,470	36	1,358,920
Hendricks	57,546	43	2,474,478	49,300	45	2,218,500
Henry	60,741	41	2,490,381	56,811	37.7	2,141,774
Howard	50,143	47	2,356,721	47,263	31	1,465,153
Huntington	41,381	38	1,572,478	40,127	33.5	1,344,254
Jackson	41,241	24	989,784	37,314	36	1,343,304
Jasper	72,622	32	2,323,904	41,051	33	1,354,683
Jay	45,353	35	1,587,355	35,970	25.6	920,832
Jefferson	31,857	30	955,710	31,698	37	1,172,826
Jennings	27,333	33	901,989	21,655	30.6	662,643

TABLE No. 2—Continued.

COUNTIES.	Acreage in 1896.	Yield per Acre	Product in Bushels in 1896.	Acreage in 1895.	Yield per Acre	Product in Bushels in 1895.
Johnson	49,069	40	1,962,760	57,467	41.6	2,390,627
Knox	59,394	37	2,197,578	62,420	41	2,559,220
Kosciusko	47,512	38	1,805,456	44,528	40	1,780,800
Lagrange	33,506	39	1,306,734	30,605	37.6	1,150,748
Lake	35,341	38	1,342,958	28,986	43	1,246,398
Laporte	49,692	36	1,788,912	46,437	33	1,548,921
Lawrence	27,722	31	859,382	25,691	36.5	937,721
Madison	70,010	43	3,010,430	66,282	27.5	1,822,755
Marion	48,761	39	1,901,679	49,214	39.6	1,948,874
Marshall	43,446	39	1,694,394	39,529	40	1,581,160
Martin	22,366	30	670,980	20,795	34	707,030
Miami	45,498	45	2,047,410	47,221	31.7	1,496,905
Monroe	20,964	33	691,812	16,547	32	529,504
Montgomery	76,879	43	3,305,797	74,117	43	3,187,031
Morgan	44,749	40	1,789,960	46,938	40	1,877,520
Newton	60,264	36	2,169,504	46,337	37	1,714,469
Noble	31,553	43	1,356,779	30,619	39	1,194,141
Ohio	6,464	42	271,188	6,426	30	192,780
Orange	28,000	20	560,000	28,425	31	881,175
Owen	23,340	31	723,540	21,816	30.7	669,751
Parke	45,570	40	1,822,800	41,322	34	1,404,948
Perry	24,466	28	685,048	20,924	31	648,644
Pike	30,198	25	754,950	30,088	38	1,143,344
Porter	33,204	37	1,228,548	28,621	36.6	1,047,522
Posey	52,720	32	1,687,040	51,996	41	2,131,836
Pulaski	45,195	31	1,401,045	34,926	33	1,152,558
Putnam	47,334	38	1,798,692	43,421	39	1,663,419
Randolph	67,262	40	2,700,480	62,718	34	2,132,412
Ripley	32,917	33	1,083,261	30,283	27.8	841,867
Rush	68,691	43	2,953,713	65,616	34	2,230,944
Scott	17,967	19	341,373	19,876	26.5	526,714
Shelby	66,660	40	2,666,400	78,682	37	2,911,234
Spencer	37,382	20	747,640	39,334	38	1,494,692
Starke	18,520	26	481,520	12,277	86	441,972
Steuben	23,122	37	855,514	24,001	40	960,010
St. Joseph	36,115	36	1,300,140	36,580	32	1,170,560
Sullivan	56,502	36	2,034,072	53,526	41.5	2,221,329
Switzerland	18,753	37	694,046	17,847	32	571,104
Tippecanoe	116,663	38	4,433,194	77,649	36.5	2,734,188
Tipton	48,821	43	2,099,303	43,909	30	1,317,270
Union	22,674	37	838,938	22,518	33	743,094
Vanderburgh	22,264	24	534,336	26,216	42.5	1,114,180
Vermillion	41,949	38	1,594,062	40,078	40	1,603,120
Vigo	62,730	30	1,881,900	62,112	35	2,173,920
Wabash	43,978	39	1,715,142	44,759	26	1,163,734
Warren	71,370	40	2,854,800	48,217	37	1,784,029
Warrick	36,261	20	725,220	39,422	31	1,222,082
Washington	36,260	26	942,760	35,593	33	1,174,569
Wayne	58,157	45	2,617,065	48,507	28	1,358,196
Wells	41,995	41	1,721,795	41,470	36.7	1,521,949
White	73,303	39	2,858,817	27,616	36	994,176
Whitley	25,249	42	1,060,458	23,811	36	857,196
Total	4,005,690		148,578,898	3,706,146		132,103,980
Average		37.09			35.37	

OATS, 1896.

TABLE No. 3.

Statement Showing by Counties the Acreage of Oats in 1896, the Average Yield per Acre and Total Product in Bushels; Also the Acreage and Product in 1895.

COUNTIES.	Acreage in 1896.	Yield per Acre.	Product in Bushels, 1893.	Acreage in 1895.	Yield per Acre.	Product in Bushels, 1895.
Adams	21,082	18	379,476	17,507	27.7	484,943
Allen	33,861	16	381,776	35,123	27.5	965,882
Bartholomew	5,962	17	101,354	8,051	21.5	173,096
Benton	64,705	31	2,005,855	65,982	18.7	1,233,863
Blackford	3,971	11	43,681	3,010	14	42,154
Boone	6,815	21	143,115	5,333	23	122,659
Brown	3,904	16	62,464	3,804	18	68,472
Carroll	9,001	24	216,024	8,683	15	130,245
Cass	10,915	23	251,045	13,394	20.8	278,595
Clark	6,231	23	143,313	5,971	20.5	122,405
Clay	10,327	18	185,886	8,520	17	144,840
Clinton	9,875	25	246,875	9,715	21	166,215
Crawford	6,138	15	92,070	4,694	23	107,962
Daviess	21,770	15	326,550	15,302	36	550,872
Dearborn	10,723	18	193,014	8,224	30	246,720
Decatur	9,304	25	232,600	6,088	30	182,580
Dekalb	20,964	21	440,244	20,957	27.8	582,604
Delaware	8,085	11	88,715	6,416	16	102,656
Dubois	9,919	21	208,299	11,004	27.8	305,911
Elkhart	14,971	22	329,362	17,804	25.6	455,782
Fayette	6,101	21	128,121	4,082	33	134,706
Floyd	3,718	15	55,770	3,726	32.5	151,095
Fountain	10,717	27	289,359	15,037	16	240,592
Franklin	13,107	18	235,926	9,849	25	246,225
Fulton	9,056	20	181,120	12,688	14	177,632
Gibson	6,502	20	130,040	7,102	17.5	124,285
Grant	9,953	25	248,825	8,230	17	139,910
Greene	11,170	18	201,060	10,414	23	239,522
Hamilton	9,681	22	212,982	8,638	17	146,816
Hancock	9,371	25	234,275	8,333	22	183,326
Harrison	13,964	14	195,496	13,019	27.5	358,022
Hendricks	7,491	29	217,239	9,666	29.8	288,046
Henry	10,872	23	250,056	7,195	21	151,035
Howard	5,594	32	179,008	5,185	15	77,775
Huntington	20,403	22	448,866	21,774	21	457,254
Jackson	15,407	18	277,326	12,666	22	278,652
Jasper	38,520	20	770,400	23,930	23.7	567,283
Jay	15,729	12	188,748	11,919	16	190,704
Jefferson	6,579	22	144,738	10,040	23.7	237,943
Jennings	6,130	16	98,080	4,052	14.6	59,159

TABLE No. 3—Continued.

COUNTIES.	Acreage in 1896.	Yield per Acre	Product in Bushels, 1896.	Acreage in 1895.	Yield per Acre.	Product in Bushels, 1895.
Johnson	3,198	22	70,356	5,640	19	107,160
Knox	7,270	22	159,940	7,887	26	199,862
Kosciusko	16,063	18	289,491	9,050	18	162,900
Lagrange	8,981	22	197,582	8,928	23	205,241
Lake	24,387	23	560,901	23,234	30	697,020
Laporte	20,839	19	395,941	23,225	24.5	569,012
Lawrence	15,400	10	154,000	12,162	28.6	347,833
Madison	9,832	22	216,304	7,209	13.7	98,763
Marion	11,239	27	303,453	11,295	17	191,875
Marshall	12,674	17	215,458	16,743	16	267,888
Martin	9,380	18	168,840	8,846	28.5	252,111
Miami	9,174	24	220,176	11,599	12	139,188
Monroe	7,976	22	175,472	6,713	22	147,686
Montgomery	10,406	21	218,526	10,075	22.5	226,687
Morgan	5,175	24	124,200	5,270	25	131,750
Newton	42,543	18	765,774	36,363	25	909,075
Noble	15,232	16	243,712	16,951	23.5	398,348
Ohio	1,510	17	25,670	1,034	25	25,850
Orange	13,498	11	148,478	13,562	25.5	278,021
Owen	7,890	16	126,080	7,341	20	146,820
Parke	10,010	26	260,260	8,305	17	141,185
Perry	6,689	16	107,024	5,583	23	128,409
Pike	5,779	20	115,580	6,763	28.7	194,098
Porter	21,522	14	301,308	20,306	22	446,732
Posey	7,250	21	152,250	7,135	27	192,645
Pulaski	19,676	20	393,560	18,660	23.7	442,242
Putnam	7,852	21	165,522	4,758	13	61,854
Randolph	18,958	16	303,328	17,086	21.6	369,057
Ripley	11,830	16	189,280	8,644	26	224,744
Rush	9,378	24	225,072	6,791	28	190,148
Scott	2,847	11	31,317	2,658	22	59,805
Shelby	6,486	22	142,692	9,257	28	259,196
Spencer	8,575	19	162,925	10,968	23	252,264
Starke	4,164	11	45,804	3,310	25	82,750
Steuben	8,610	24	206,640	10,300	29	298,700
St. Joseph	17,396	20	347,920	15,149	16	242,384
Sullivan	13,780	14	192,920	10,047	30.5	306,433
Switzerland	5,433	12	65,196	3,220	20	64,400
Tippecanoe	23,226	22	510,972	24,568	14	343,952
Tipton	3,649	17	62,033	2,105	30	63,050
Union	4,283	20	85,660	2,903	30	87,090
Vanderburgh	3,611	18	64,998	4,363	40.5	176,701
Vermillion	9,395	23	216,085	7,813	19	70,317
Vigo	11,304	15	169,560	10,764	24.6	264,794
Wabash	16,073	33	530,409	17,674	20	353,480
Warren	32,416	24	777,984	26,534	15	398,910
Warrick	11,946	17	203,082	8,757	24	210,168
Washington	20,105	17	341,785	16,560	34	563,040
Wayne	13,787	19	261,953	9,699	30	290,970
Wells	17,630	24	423,120	14,883	22.6	336,335
White	42,344	19	804,536	37,738	19.8	747,212
Whitley	16,997	17	288,949	19,280	18	347,040
Total	1,180,057		23,689,234	1,098,700		24,601,831
Average		20.07			22.5	

RYE, 1896.

TABLE No. 4.

Statement Showing by Counties the Acreage of Rye in 1896, Yield per Acre and Product in Bushels; Also the Same for 1895.

COUNTIES.	Acreage in 1895.	Yield per Acre	Product in Bushels.	Acreage in 1896.	Yield per Acre.	Product in Bushels.
Adams	2,831	10	28,310	879	11	9,669
Allen	4,194	10	41,940	2,539	15	38,085
Bartholomew	1,339	12	16,068	714	10	7,140
Benton	1,525	11	16,775	231	15	3,195
Blackford	3,273	10	32,730	1,084	13	14,092
Boone	9,681	10	96,810	3,729	9	33,561
Brown	899	7	6,293	217	12	3,604
Carroll	6,128	8	49,024	831	12	9,984
Cass	10,173	7	71,211	1,558	16	24,928
Clark	337	8	2,696	475	15	7,125
Clay	897	14	12,558	729	9	6,561
Clinton	11,424	13	148,512	2,972	17	20,804
Crawford	148	10	1,480	172	9	1,548
Daviess	1,618	7	11,326	1,526	10	15,260
Dearborn	1,339	6	8,034	1,562	16	24,992
Decatur	815	12	9,780	159	12	1,908
Dekalb	6,621	8	52,968	2,384	16	38,144
Delaware	8,030	14	112,400	1,989	12	23,868
Dubois	190	9	1,710	474	18	8,532
Elkhart	21,317	10	213,170	10,771	14	150,794
Fayette	1,011	10	10,110	401	17	6,817
Floyd	281	15	4,215	537	18	4,296
Fountain	5,125	12	61,500	2,270	15	34,050
Franklin	2,266	11	24,926	1,100	13	14,300
Fulton	5,626	6	33,816	1,805	11	19,855
Gibson	999	12	11,988	1,460	17	24,820
Grant	8,486	15	127,290	2,005	14	28,070
Greene	1,101	11	12,111	782	12	9,384
Hamilton	7,879	13	102,427	2,069	13	26,897
Hancock	3,468	16	55,488	1,401	17	23,817
Harrison	827	11	9,097	836	10	8,360
Hendricks	2,617	12	31,764	1,444	16	23,104
Henry	6,069	13	78,897	1,312	19	24,928
Howard	8,284	11	91,124	1,541	11	16,951
Huntington	5,283	9	47,592	940	13	12,220
Jackson	1,225	10	12,250	727	14	10,178
Jasper	5,317	13	69,121	2,941	13	38,233
Jay	3,055	8	24,440	1,543	6	9,258
Jefferson	1,296	10	12,960	1,025	11	11,275
Jennings	494	9	4,446	183	11	2,013

TABLE No. 4—Continued.

COUNTIES.	Acreage in 1896	Yield per Acre.	Product in Bushels.	Acreage in 1895.	Yield per Acre.	Product in Bushels.
Johnson	1,514	16	24,224	1,190	18	21,420
Knox	1,817	13	23,621	1,885	15	28,275
Kosciusko	12,158	10	121,580	4,140	15	62,100
Lagrange	13,957	9	125,613	4,933	14	69,060
Lake	3,519	14	49,266	2,396	19	45,524
Laporte	9,884	13	128,492	3,762	14	52,668
Lawrence.	314	10	3,140	377	15	5,655
Madison	10,836	9	97,524	2,538	11	27,918
Marion	2,453	10	24,580	958	15	14,370
Marshall	11,096	13	144,248	3,593	13	46,709
Martin	277	6	1,662	208	11	2,288
Miami	9,346	15	140,190	1,683	13	21,879
Monroe.	431	12	5,208	482	16	7,712
Montgomery	9,785	14	136,990	3,106	19	59,014
Morgan.	1,018	10	10,180	699	14	9,786
Newton	2,424	12	29,088	1,399	13	18,187
Noble.	8,513	9	76,617	2,573	20	51,460
Ohio	678	8	5,424	462	12	5,544
Orange	377	10	3,770	247	10	2,470
Owen	1,272	13	16,536	688	14	9,632
Parke.	4,123	10	41,230	1,688	12	20,256
Perry	287	13	3,731	447	14	6,258
Pike	1,921	11	21,131	2,266	15	33,990
Porter	6,211	12	74,532	4,268	12	51,216
Posey.	2		3,200	301	15	4,560
Pulaski.	8,418	8	67,344	5,481	10	54,810
Putnam.	2,147	9	19,323	993	19	18,867
Randolph.	3,753	16	60,048	966	15	14,490
Ripley	2,083	8	16,744	787	10	7,870
Rush	2,067	12	24,804	408	14	5,712
Scott	98	10	980	214	10	2,140
Shelby	1,199	16	19,184	407	14	5,696
Spencer.	658	10	6,580	515	12	6,180
Starke	4,334	10	43,340	3,463	7	24,241
Steuben.	6,441	9	57,969	2,617	19	49,723
St. Joseph	12,947	11	142,417	5,960	12	71,520
Sullivan	1,292	9	11,628	1,072	12	12,864
Switzerland	2,101	9	18,909	2,195	11	24,145
Tippecanoe.	3,966	12	47,592	1,074	13	13,962
Tipton	6,482	10	64,820	2,003	10	20,030
Union.	528	14	7,392	210	20	2,010
Vanderburgh	418	12	5,016	229	15	3,435
Vermillion	3,895	15	58,425	1,377	15	20,655
Vigo	3,132	10	31,320	2,385	10	23,850
Wabash.	9,386	9	83,934	1,934	17	32,878
Warren.	1,772	10	17,720	900	14	12,600
Warrick	1,029	11	11,319	911	12	10,932
Washington	369	10	3,690	228	15	3,420
Wayne	2,480	15	37,200	853	16	13,648
Wells.	4,762	14	66,668	2,152	9	19,368
White.	6,100	9	54,900	1,164	13	15,132
Whitley.	3,238	10	32,380	817	14	11,438
Total	369,409		4,082,800	148,864		1,972,189
Average.		11.05			13.24	

BARLEY, 1896.

TABLE No 4.

Statement Showing by Counties the Acreage of Barley in 1896, the Average Yield per Acre, and Total Product in Bushels; Also the Acreage and Product in 1895.

COUNTIES.	Acreage in 1896.	Yield per Acre.	Product in Bushels, 1896.	Acreage in 1895.	Yield per Acre.	Product in Bushels, 1895.
Adams	223	30	6,690	744	15	11,160
Allen	152	16	2,432	317	25	7,925
Bartholomew	331	20	6,620	503	10	5,030
Benton	37	10	370	88	10	880
Blackford	30	12	360	174	10	1,740
Boone	207	20	4,140	175	15	2,625
Brown	25	12	300	5	10	50
Carroll	7	15	105	115	15	1,725
Cass	23	16	368	235	16	3,760
Clark	213	23	5,589	735	15	11,005
Clay	7	10	70	128	10	1,280
Clinton	106	12	1,272	20	12	240
Crawford	27	15	405	7	15	105
Daviess	75	10	750	115	18	2,070
Dearborn	885	13	11,505	855	29	24,795
Decatur	131	13	1,703	43	15	645
Dekalb	170	27	4,590	313	20	6,260
Delaware	172	32	5,504	178	15	2,670
Dubois	498	13	6,474	2,478	27	66,906
Elkhart	115	13	1,495	362	35	12,670
Fayette	39	18	702	110	21	2,310
Floyd	151	15	2,265	104	30	3,120
Fountain	3	20	60	29	20	580
Franklin	847	19	16,093	928	25	23,200
Fulton	51	19	969	52	19	988
Gibson	33	20	660	76	20	1,520
Grant	65	30	1,950	147	15	2,205
Greene	106	25	2,650	663	25	16,575
Hamilton	176	15	2,640	297	15	4,455
Hancock	1,073	22	23,606	1,356	17	23,052
Harrison	341	18	6,138	839	30	25,170
Hendricks	37	30	1,110	14	25	350
Henry	866	22	19,052	1,050	26	27,300
Howard	39	37	1,443	162	15	2,430
Huntington	19	5	95	96	5	480
Jackson	21	10	210	25	10	250
Jasper	12	20	240	656	20	13,120
Jay	368	10	3,680	249	10	2,490
Jefferson	653	25	16,325	901	25	22,525
Jennings	16	15	240	7	15	105

TABLE No. 4—Continued.

COUNTIES.	Acreage in 1896.	Yield per acre.	Product in Bushels, 1896.	Acreage in 1895.	Yield per Acre.	Product in Bushels, 1895.
Johnson	45	30	1,350	37	20	740
Knox	13			1,279	15	19,185
Kosciusko	90	15	1,350	238	20	4,760
Lagrange	41			1,791	15	26,865
Lake	72	15	1,080	43	27	1,151
Laporte	78			130	15	1,950
Lawrence	18			18	16	288
Madison	43	20	860	349	15	5,235
Marion	363			703	27	18,981
Marshall	144	12	1,723	529	17	8,993
Martin	20	15	300	69	18	1,242
Miami	77	27	2,079	885	15	13,275
Monroe	9			35	20	700
Montgomery	113	15	1,695	238	16	3,808
Morgan	44			42	17	714
Newton	38			13	16	208
Noble	58			278	12	3,444
Ohio	67			62	15	930
Orange	76			21	18	378
Owen	3			25	16	400
Parke	34			405	15	6,075
Perry	350	15	5,250	808	21	16,968
Pike	296	17	5,032	291	26	7,566
Porter	3			10	20	200
Posey	304	23	6,992	303	18	5,454
Pulaski	1	10	10	1,031	17	18,377
Putnam	2			34	18	612
Randolph	1,296	35	45,360	1,138	19	21,622
Ripley	17	15	255	171	12	2,052
Rush	153	20	3,060	132	17	2,244
Scott	7			131	15	1,965
Shelby	278	36	10,008	634	25	15,850
Spencer	745	14	10,430	1,540	24	36,960
Starke	7			61	12	732
Steuben	339	25	8,475	259	12	3,108
St. Joseph	173	15	2,595	1,067	13	13,871
Sullivan	28			118	11	1,298
Switzerland	108	23	2,484	108	25	2,700
Tippecanoe	20			165	20	3,300
Tipton	187			63	20	1,260
Union	37	30	1,110	29	15	435
Vanderburgh	248	10	2,480	55	10	550
Vermillion	54			139	10	1,390
Vigo	44			164	12	1,960
Wabash	86	20	1,720	147	13	1,521
Warren	12			112	12	1,344
Warrick	118	15	1,770	170	16	2,720
Washington	335	17	5,695	82	30	2,460
Wayne	488	21	10,248	519	25	12,975
Wells	391	20	7,820	354	20	7,080
White	36			752	21	15,792
Whitley	38	8	304	62	10	620
Total	16,045		296,914	33,222		659,058
Average		18.5			19.8	

POTATOES, 1896.

TABLE No. 6.

Statement Showing by Counties the Acreage of Potatoes in 1896, the Average Yield per Acre, and Total Product in Bushels; Also the Acreage and Product in 1895.

COUNTIES.	Acreage in 1896.	Yield per Acre	Product in Bushels, 1896.	Acreage in 1895.	Yield per Acre	Product in Bushels, 1895.
Adams	1,015	63	63,915	716	37	26,492
Allen	3,139	82	257,398	4,351	72	313,488
Bartholomew	738	113	83,394	817	57	46,569
Benton	768	77	59,136	433	78	33,774
Blackford	546	35	19,110	476	75	35,600
Boone	756	106	80,136	548	90	49,320
Brown	416	56	23,296	618	62	38,316
Carroll	1,027	93	95,511	706	45	31,771
Cass	1,519	75	113,925	1,468	70	102,760
Clark	931	55	51,205	839	70	33,481
Clay	615	72	44,280	510	79	50,250
Clinton	726	60	43,560	478	40	19,120
Crawford	409	45	18,405	144	90	12,960
Daviess	616	80	51,680	580	118	68,440
Dearborn	1,309	68	89,012	1,318	67	90,316
Decatur	593	91	53,963	320	82	26,240
Dekalb	1,715	48	82,320	1,543	74	114,182
Delaware	1,213	104	126,152	1,015	65	65,935
Dubois	465	47	21,855	996	78	76,688
Elkhart	2,174	41	89,134	2,813	70	199,010
Fayette	743	97	72,071	622	90	55,980
Floyd	803	71	57,013	907	83	75,281
Fountain	609	90	54,810	354	68	24,072
Franklin	1,209	89	107,601	1,195	53	63,335
Fulton	1,007	32	32,224	1,326	50	66,300
Gibson	569	71	40,399	369	80	29,520
Grant	1,084	134	145,256	864	49	42,336
Greene	367	75	27,525	449	38	17,062
Hamilton	1,240	71	88,040	3,274	40	131,120
Hancock	329	90	29,610	275	57	14,025
Harrison	1,522	75	114,150	1,243	73	90,739
Hendricks	1,677	74	124,098	885	89	72,570
Henry	941	107	100,687	958	82	78,556
Howard	1,129	112	126,448	910	50	45,500
Huntington	1,333	63	83,979	1,181	47	55,507
Jackson	692	102	70,584	737	53	39,061
Jasper	1,219	93	113,367	677	84	56,868
Jay	832	56	46,592	477	41	18,324
Jefferson	1,151	75	86,325	896	102	91,688
Jennings	450	101	45,450	179	67	11,993

TABLE No. 6—Continued.

COUNTIES.	Acreage in 1896	Yield per Acre.	Product in Bushels, 1896.	Acreage in 1895.	Yield per Acre.	Product in Bushels, 1895.
Johnson	325	44	14,300	437	52	22,744
Knox	801	40	32,010	483	70	33,810
Kosciusko	2,404	45	108,180	1,896	70	132,720
Lagrange	1,781	65	115,765	2,198	111	243,978
Lake	1,517	92	139,564	1,399	108	151,092
Laporte	2,008	81	162,648	1,816	64	116,224
Lawrence	248	118	29,264	247	76	18,772
Madison	687	60	41,220	450	31	13,950
Marion	3,080	81	249,480	2,940	49	142,149
Marshall	2,375	49	116,375	2,027	61	123,642
Martin	448	62	27,776	267	96	25,632
Miami	1,369	78	106,762	1,211	48	58,128
Monroe	385	72	27,720	288	62	17,856
Montgomery	1,909	62	118,358	499	77	37,423
Morgan	270	75	20,250	345	57	19,465
Newton	696	100	69,600	397	76	30,172
Noble	1,572	65	102,180	1,810	117	211,770
Ohio	369	90	33,210	354	50	17,700
Orange	173	40	6,920	90	60	5,400
Owen	250	64	16,000	259	40	10,360
Parke	390	88	34,320	287	70	20,090
Perry	730	39	28,470	747	65	48,555
Pike	332	78	25,896	314	87	27,318
Porter	1,713	73	125,049	1,529	83	126,907
Posey	876	96	84,096	1,030	52	53,560
Pulaski	819	57	46,683	730	67	48,910
Putnam	507	72	36,504	146	64	9,344
Randolph	1,077	84	94,776	633	57	36,061
Ripley	1,106	62	68,572	1,117	61	68,137
Rush	454	96	43,584	372	48	17,836
Scott	225	40	9,000	103	75	7,725
Shelby	907	82	74,374	545	53	28,585
Spencer	6,622	37	245,014	5,731	65	372,515
Starke	1,077	65	70,005	844	80	67,520
Steuben	2,789	64	178,496	1,391	96	133,536
St. Joseph	2,962	41	118,982	3,610	56	202,166
Sullivan	234	55	12,870	150	60	9,000
Switzerland	1,456	118	171,808	1,080	59	63,720
Tippecanoe	1,338	87	116,406	975	73	71,175
Tipton	1,608	75	120,600	276	35	9,660
Union	342	71	24,282	266	55	14,630
Vanderburgh	1,573	59	92,807	2,295	36	107,826
Vermillion	321	98	31,458	284	60	25,560
Vigo	777	65	50,505	872	60	52,560
Wabash	1,369	85	116,365	1,278	56	71,568
Warren	525	113	59,325	528	40	21,120
Warrick	3,035	30	91,050	2,606	39	101,634
Washington	319	61	19,459	304	66	20,064
Wayne	1,786	71	126,806	900	45	40,500
Wells	1,030	78	80,340	824	57	46,968
White	932	71	66,172	425	52	22,100
Whitley	941	77	72,457	963	77	74,151
Total	102,425	. . .	7,107,809	91,502	. .	5,963,557
Average . . . . .	. . . . .	69.39	. . . . .	. . . . .	65.17	. . . . .

TIMOTHY MEADOW, 1896.

TABLE No. 7.

Statement Showing by Counties the Acreage in Timothy Meadow in 1896, Yield in Tons per Acre, Total Product and Seed Saved; Also the Same for 1895.

COUNTIES.	Acreage in 1896.	Yield in Tons per Acre, 1896.	Product in Tons.	Timothy Seed Saved in 1896.	Acreage in 1895.	Yield in Tons per Acre, 1895.	Product in Tons.	Timothy Seed Saved in 1895.
Adams	19,142	1.40	26,798	112	21,406	.50	10,703	1,593
Allen	36,826	1.37	49,715	305	37,547	.45	16,896	496
Bartholomew	14,889	.90	12,950	1,046	17,361	1.00	17,361	849
Benton	13,729	1.40	19,220	215	28,854	.40	11,540	1,555
Blackford	8,372	.90	7,534	20	15,714	.40	6,285	85
Boone	16,193	1.55	25,099	231	19,167	.50	9,583	3,082
Brown	11,529	1	11,329	1,496	13,588	.60	8,152	185
Carroll	9,800	1.25	12,250	230	11,276	.50	5,638	201
Cass	9,057	1.50	13,585	36	9,542	.75	7,156	13
Clark	10,728	1.30	13,946	663	13,044	1	13,044	530
Clay	17,909	1.15	20,595	503	21,321	.65	13,859	719
Clinton	11,002	1.70	18,703	1,300	12,569	.50	6,282	1,037
Crawford	7,887	1.10	8,673	82	8,213	1.15	9,444	4
Daviess	13,797	1.50	20,695	815	15,759	1	15,750	1,008
Dearborn	19,417	.70	13,592	201	21,716	1	21,716	34
Decatur	11,768	1.25	14,710	375	14,901	1	14,904	1,267
Dekalb	19,647	1.40	27,505	245	20,159	.70	14,111	525
Delaware	19,121	1.60	30,593	52	23,113	.50	11,506	958
Dubois	15,188	1.40	21,263	133	10,733	1.25	13,416	125
Elkhart	15,795	1.20	18,954	119	17,383	1.45	7,822	301
Fayette	6,721	1.10	7,393	278	7,781	.75	5,835	309
Floyd	3,928	1.50	5,892	8	4,421	1.50	6,631	17
Fountain	11,179	1.35	15,091	75	14,862	.60	8,917	571
Franklin	13,138	1	13,138	569	13,153	.85	11,180	298
Fulton	5,246	1.90	9,967	51	7,412	.50	3,706	277
Gibson	8,922	1.50	13,383	144	10,844	1.35	14,639	102
Grant	17,423	1.55	27,005	127	21,355	.40	8,542	2,417
Greene	19,603	1.25	24,501	827	27,124	.80	21,699	957
Hamilton	14,047	1.50	21,070	237	15,521	.40	6,212	861
Hancock	9,203	1.35	12,424	86	8,998	.35	3,149	144
Harrison	8,915	1.15	10,252	269	10,965	1.50	16,447	79
Hendricks	18,488	1.20	22,185	187	17,594	.60	10,556	764
Henry	9,714	1.45	14,085	163	10,920	.85	9,282	3,166
Howard	9,892	1.65	16,321	24	12,206	.35	4,272	278
Huntington	19,377	1.60	31,003	167	19,411	.60	11,646	955
Jackson	17,456	1.15	20,074	595	23,186	1	23,186	650
Jasper	21,088	1.35	28,468	293	16,134	.50	8,067	833
Jay	22,946	1.30	29,829	249	25,443	.35	8,905	1,418
Jefferson	9,434	.95	8,962	261	14,704	.80	11,763	352
Jennings	17,495	.75	13,122	441	19,145	.70	13,401	190

TABLE No. 7—Continued

COUNTIES.	Acreage in 1896.	Yield in Tons per Acre, 1896	Product in Tons.	Timothy Seed Saved in 1896	Acreage in 1895.	Yield in Tons per Acre, 1895.	Product in Tons.	Timothy Seed Saved in 1895.
Johnson	9,312	1.50	13,968	110	9,878	.65	6,450	353
Knox	9,152	1.45	13,270	348	9,107	.95	8,651	463
Kosciusko	13,708	1.50	20,559	283	12,610	.45	5,674	54
Lagrange	12,450	1.20	14,940	74	9,386	.55	5,162	10
Lake	36,560	1.35	49,356	567	40,715	.55	22,393	1,838
Laporte	11,489	1.20	13,786	194	14,680	.65	9,541	620
Lawrence	18,952	1.35	25,585	932	19,155	1	19,155	142
Madison	23,599	1.30	30,678	69	15,922	.30	4,776	932
Marion	22,142	1.35	29,891	202	23,689	.45	10,660	421
Marshall	6,734	1.45	9,764	160	4,762	.50	3,731	638
Martin	9,833	1.35	13,274	296	11,284	.90	10,155	262
Miami	10,637	1.50	14,749	64	12,126	.40	4,850	120
Monroe	18,006	1.20	21,607	1,553	17,767	.65	11,518	478
Montgomery	18,552	1.80	33,393	169	18,431	.80	14,736	2,829
Morgan	11,950	1.40	16,730	91	14,740	.60	8,844	638
Newton	11,403	1.30	14,823	1	11,977	.55	6,585	457
Noble	13,655	1.40	19,117	24	12,148	.55	6,681	47
Ohio	4,845	.75	3,633	7	5,421	.50	2,710	10
Orange	10,210	1.15	11,741	454	13,333	1	13,303	290
Owen	19,136	1.25	23,920	792	21,430	.60	14,658	988
Parke	12,789	1.50	19,183	147	16,476	.50	8,238	290
Perry	6,650	1.35	8,977	154	4,885	1.20	58,562	49
Pike	8,537	1.35	11,524	171	14,152	1.25	17,690	168
Porter	25,510	1.35	34,438	24	27,416	.50	13,708	313
Posey	8,075	1.75	14,131	382	9,075	1.40	12,705	428
Pulaski	6,506	1.60	10,409	57	10,000	.75	7,500	172
Putnam	18,905	1.45	27,412	152	22,428	.55	12,335	519
Randolph	17,374	1.55	26,929	486	18,109	.95	17,103	503
Ripley	21,695	.80	17,356	654	29,149	.85	24,776	360
Rush	10,375	1.40	14,525	329	11,394	.75	8,545	1,222
Scott	4,600	.95	4,370	330	5,198	.75	3,898	421
Shelby	9,673	1.20	11,607	130	11,427	1	11,427	1,583
Spencer	11,158	1	11,158	94	11,282	1.10	12,410	395
Starke	1,615	1.55	2,503	9	1,971	.95	1,872	17
Steuben	13,379	1.60	21,406	183	14,927	.85	12,687	104
St. Joseph	12,946	1.25	16,182	73	13,893	.45	6,251	177
Sullivan	14,594	1.50	21,891	234	14,910	.75	11,182	309
Switzerland	10,941	.90	9,846	263	13,111	.45	5,899	13
Tippecanoe	12,444	1.30	16,177	205	14,921	.40	5,968	3,990
Tipton	7,521	1.75	13,161	181	9,877	.30	2,963	238
Union	3,463	1.25	4,329	221	4,603	1	4,603	299
Vanderburgh	8,194	1.30	10,652	30	10,588	1.25	13,235	260
Vermillion	5,904	1.50	8,856	162	7,225	.75	5,418	251
Vigo	13,614	1.20	16,336	153	17,859	.80	14,287	1,303
Wabash	14,513	1.50	21,769	228	18,993	.35	6,647	1,082
Warren	10,270	1.60	16,432	143	14,966	.35	3,838	683
Warrick	9,812	1.15	11,283	217	10,851	.85	9,223	1,003
Washington	19,283	1	19,283	3,076	22,577	1	22,571	990
Wayne	12,177	1.30	15,830	441	10,092	.75	7,569	1,052
Wells	19,590	1.35	26,446	837	22,756	.45	10,240	3,581
White	20,188	1.50	30,282	148	22,964	.30	6,889	80
Whitley	15,625	1.85	28,906	43	14,527	.65	9,442	
Total	1,243,969		1,650,252	29,480	1,451,272		1,003,147	62,650
Average		1.32				.69		

CLOVER MEADOW, 1896.

TABLE No. 8.

Statement Showing by Counties the Acreage in Clover Meadow in 1896, Yield in Tons per Acre, Product in Tons, and Seed Saved ; Also the Same for 1895.

COUNTIES.	Acreage in 1896.	Yield in Tons per Acre, 1895.	Product in Tons.	Clover Seed Saved in 1896.	Acreage in 1895.	Yield in Tons per Acre, 1895.	Product in Tons.	Clover Seed Saved in 1895.
Adams	1,541	1.25	1,926	524	6,357	.80	5,085	1,640
Allen	3,649	1	3,649	1,935	19,024	.65	12,366	2,385
Bartholomew	15,893	1	15,893	12,400	19,829	1.30	25,777	8,968
Benton	1,512	1.45	2,702	169	2,245	.70	1,570	346
Blackford	686	1.25	857	135	2,766	.85	2,350	212
Boone	17,098	1.30	22,227	11,062	26,010	1.10	28,611	13,073
Brown	2,108	1.60	3,372	675	1,195	.90	1,175	271
Carroll	16,833	1.35	22,724	6,438	21,439	1.40	30,014	6,395
Cass	10,440	1.35	14,094	3,612	16,672	1	16,672	5,705
Clark	6,637	1.60	10,619	2,745	7,240	1.30	9,412	1,667
Clay	9,991	1.60	15,935	5,359	6,172	1.35	8,332	1,430
Clinton	16,971	1.85	31,396	5,989	27,498	1.20	32,997	9,092
Crawford	3,581	1.40	5,013	1,417	3,885	1.50	5,827	530
Daviess	10,459	1.40	14,642	4,897	11,327	1.75	19,822	4,115
Dearborn	2,233	.90	2,009	396	3,327	1.10	3,659	441
Decatur	11,316	1.50	16,974	7,267	12,202	1.40	17,082	4,095
Dekalb	4,569	1.50	6,853	2,224	10,122	.75	7,591	1,349
Delaware	3,444	1.50	5,166	2,529	15,813	.90	14,231	2,025
Dubois	10,591	1.30	13,768	834	9,862	1.20	11,834	2,216
Elkhart	6,551	1	6,551	3,682	19,437	.50	9,718	5,896
Fayette	5,923	1	5,923	4,123	14,265	1.25	17,831	6,894
Floyd	2,577	1.65	4,252	869	3,029	1.75	5,300	560
Fountain	9,691	1.55	15,021	4,468	13,433	1.20	16,119	4,602
Franklin	9,007	1	9,007	6,467	12,858	1.05	13,290	4,966
Fulton	3,696	1.80	6,652	894	11,938	.40	4,775	3,522
Gibson	23,142	1.80	41,655	8,568	22,004	1.75	38,507	8,813
Grant	4,427	1.40	6,197	1,610	14,479	.70	10,135	4,271
Greene	7,741	1.50	11,611	3,381	8,333	1.25	10,416	1,484
Hamilton	12,420	1.10	13,662	6,575	20,809	.70	14,566	6,271
Hancock	9,491	1.25	11,864	6,131	19,147	.60	11,488	5,807
Harrison	12,631	1.30	16,420	5,797	15,268	1.05	15,991	4,123
Hendricks	15,475	1.50	23,212	14,040	17,412	1.35	23,506	10,959
Henry	10,770	1	10,770	9,848	24,409	1.10	26,409	17,712
Howard	6,487	1.40	9,081	3,747	13,008	.55	7,154	4,047
Huntington	4,215	1.30	5,479	1,563	11,828	.90	10,645	1,908
Jackson	6,472	1.30	8,413	3,355	6,579	1.45	9,534	1,219
Jasper	882	1.40	1,230	995	696	.70	487	165
Jay	1,929	.80	1,543	1,783	8,788	.75	6,571	2,584
Jefferson	6,174	.90	5,956	2,884	10,721	1.30	13,987	3,299
Jennings	6,615	1	6,615	3,545	5,267	1.15	6,057	1,325

TABLE No. 8—Continued.

COUNTIES.	Acreage in 1896.	Yield in Tons per Acre, 1896.	Product in Tons.	Clover Seed Saved in 1896.	Acreage in 1895.	Yield in Tons per Acre, 1895.	Product in Tons.	Clover Seed Saved in 1895.
Johnson	15,426	1.60	24,681	13,450	17,247	1.40	24,145	9,728
Knox	22,915	1.70	38,955	8,174	20,218	1.75	35,381	10,299
Kosciusko	11,335	1.10	12,468	3,855	25,611	.60	15,366	6,504
Lagrange	6,273	1	6,273	4,703	18,196	.60	10,917	6,389
Lake	1,035	1.50	1,552	341	2,747	.80	2,197	982
Laporte	5,497	1.20	6,596	814	14,069	.60	8,441	1,580
Lawrence	9,424	1.30	12,251	1,574	6,579	1.65	10,853	1,395
Madison	10,833	1.25	13,541	3,979	18,603	.65	10,091	4,117
Marion	9,037	1.60	14,459	5,239	16,643	1	16,943	6,577
Marshall	6,792	1.35	9,169	2,891	21,888	.55	12,038	5,414
Martin	3,684	1.80	5,157	1,859	2,832	1.40	3,964	639
Miami	6,318	1.15	7,265	1,087	17,804	.70	12,462	3,692
Monroe	2,309	1.40	3,232	1,312	1,721	1.15	1,979	625
Montgomery	17,095	2	34,190	13,856	22,208	1.40	31,091	14,947
Morgan	7,966	1.50	11,949	6,400	10,302	1.55	15,968	6,956
Newton	920	1	920	49	462	1	462	177
Noble	8,578	1.10	9,435	6,543	28,080	.80	22,464	7,069
Ohio	403	1	403	195	493	1	496	84
Orange	4,336	1.40	6,070	1,213	4,699	1	4,699	424
Owen	4,095	1.50	6,142	2,433	4,128	.90	3,724	992
Parke	9,141	1.35	12,340	9,159	11,426	1.25	14,282	3,667
Perry	5,577	1.50	8,365	2,730	5,089	1.10	5,597	932
Pike	8,898	1.35	12,012	3,572	10,137	1.70	17,236	4,469
Porter	3,865	1.30	5,024	620	3,399	.80	2,717	362
Posey	14,783	1.90	28,093	5,285	15,983	1.70	27,171	5,175
Pulaski	987	2	1,974	72	3,948	.80	3,158	761
Putnam	12,650	1.70	21,506	9,590	11,153	1.65	18,402	4,900
Randolph	8,306	1.40	11,628	5,980	17,558	1.20	21,069	3,906
Ripley	4,597	.85	3,907	1,713	4,924	1	4,924	1,359
Rush	14,671	1.25	18,339	12,687	26,684	1.30	34,689	12,508
Scott	4,700	1.30	6,110	3,195	4,813	1.50	7,219	1,145
Shelby	15,478	1.30	20,121	6,519	16,034	1.55	24,884	7,988
Spencer	11,639	1.50	17,458	6,300	9,657	1.50	14,884	7,491
Starke	639	1.50	958	142	1,381	1	1,381	225
Steuben	4,931	1.35	6,656	1,660	11,996	1	11,996	1,326
St. Joseph	4,962	.85	4,217	1,014	15,590	.40	6,236	3,414
Sullivan	25,307	1.60	40,491	16,195	17,013	1.10	18,714	3,232
Switzerland	2,794	1	2,794	618	3,296	.70	2,307	130
Tippecanoe	8,349	1.60	13,358	3,406	15,503	1.25	19,373	3,218
Tipton	6,226	1.25	7,782	4,176	11,163	.55	6,139	2,821
Union	5,681	.90	5,112	3,004	9,782	1.50	14,673	2,122
Vanderburgh	8,663	1.40	12,128	2,446	8,522	1.70	14,487	1,225
Vermillion	5,468	1.65	9,022	1,685	4,824	1.55	7,477	738
Vigo	7,751	1.60	12,401	3,420	7,745	1.30	10,068	1,251
Wabash	7,281	1.20	8,737	1,170	16,867	.50	8,433	2,622
Warren	3,584	1.50	5,376	941	7,562	1.10	8,318	1,960
Warrick	10,199	1.40	14,278	5,064	12,330	1.50	18,495	3,880
Washington	8,604	1.60	13,766	4,995	8,176	1.75	14,308	1,017
Wayne	7,102	1.45	10,297	4,797	27,828	.90	25,045	8,340
Wells	3,725	1.15	4,283	1,290	10,328	.70	7,229	1,894
White	3,001	1.35	4,051	775	5,826	.90	5,243	1,117
Whitley	4,754	1.80	8,557	2,020	10,849	.80	8,679	976
Total	713,555	..	1,001,901	371,188	1,098,442	..	1,182,262	351,133
Average . . . . .	..	1.41	..	..	..	1.07	..	..

TOBACCO, 1896.

TABLE No. 9.

Statement Showing by Counties the Acreage of Tobacco in 1896, the Average Yield per Acre and Total Product in Pounds; Also the Acreage and Product in 1895.

COUNTIES.	Acre- age in 1896.	Yield per Acre.	Product in Pounds, 1896.	Acre- age in 1895.	Yield per Acre.	Product in Pounds, 1895
Adams				2	1,000	2,000
Allen						
Bartholomew	2	800	1,600	160	1,100	176,000
Benton	1	300	300			
Blackford				1	800	800
Boone				5	1,200	6,000
Brown	5	750	3,750	11	1,000	11,000
Carroll	1	500	500			
Cass				8	800	6,400
Clark	83	700	58,100	385	1,000	385,000
Clay	6	600	3,600			
Clinton						
Crawford	4	300	1,200	9	250	2,250
Daviess	6	600	3,600	18	1,500	27,000
Dearborn	102	765	78,030	102	1,300	132,600
Decatur						
Dekalb				1	1,000	1,000
Delaware				5	1,200	6,000
Dubois	23	600	13,800	118	900	106,200
Elkhart	1	400	400			
Fayette	77	500	38,500	144	2,400	345,600
Floyd				9	1,600	14,400
Fountain						
Franklin	45	900	40,500	11	1,200	13,200
Fulton	6	1,000	6,000			
Gibson	3	650	1,950	7	1,000	7,000
Grant						
Greene	36	250	9,000	66	250	16,500
Hamilton				1	800	800
Hancock	1	475	475			
Harrison	50	1,000	50,000	30	3,000	90,000
Hendricks						
Henry	4	900	3,600	1	1,500	1,500
Howard				7	1,000	7,000
Huntington				3	800	2,400
Jackson				6	1,000	6,000
Jasper						
Jay	2	625	1,250	7	1,000	7,000
Jefferson	1,092	725	791,700	696	1,000	696,000
Jennings	6	1,000	6,000	1	1,200	1,200

TABLE No. 9—Continued.

COUNTIES.	Acre- age in 1896.	Yield per Acre.	Product in Pounds, 1896.	Acre- age in 1895.	Yield per Acre.	Product in Pounds, 1895.
Johnson.. . . .	6	1,200	7,200	43	2,250	96,750
Knox	1	950	950	1	1,600	1,600
Kosciusko	4	350	1,400			
Lagrange						
Lake						
Laporte				3	1,200	36,000
Lawrence				6	2,000	12,000
Madison	4	550	2,200			
Marion	5	700	3,500	3	1,000	3,000
Marshall	23	500	11,500	2	1,100	2,200
Martin	25	600	15,000	14	1,300	18,200
Miami	19	700	13,300			
Monroe	6	1,100	6,600	2	2,000	4,000
Montgomery						
Morgan	1	850	850	3	1,600	4,800
Newton						
Noble	1	435	435			
Ohio	207	1,200	248,400	240	250	60,000
Orange	37	800	29,600	6	1,000	6,000
Owen	10	1,100	11,000	7	2,000	14,000
Parke	27	800	21,600	10	1,400	14,000
Perry	61	1,000	61,000	54	1,000	54,000
Pike	57	1,100	62,700	58	1,900	110,200
Porter						
Posey	25	900	22,500	19	1,000	19,000
Pulaski						
Putnam	1	750	750	3	1,600	4,800
Randolph	12	700	8,400	16	1,000	16,000
Ripley	11	950	10,450	1	1,300	1,300
Rush	297	500	148,500	426	2,300	979,800
Scott	3	850	2,550	16	1,300	20,800
Shelby	14	700	9,800	29	800	23,200
Spencer	1,563	425	664,275	1,673	900	1,505,700
Starke						
Steuken						
St. Joseph				12	800	9,600
Sullivan	1	550	550	2	500	1,000
Switzerland	2,437	900	2,193,300	1,433	800	1,146,400
Tippecanoe	1	775	775	20	1,000	20,000
Tipton	5	400	2,000			
Union						
Vanderburgh	33	1,000	33,000	2	1,100	2,200
Vermillion				2	800	1,600
Vigo						
Walash	10	450	4,500	8	700	5,600
Warren						
Warrick	472	800	377,600	610	1,000	610,000
Washington	17	500	8,500	11	2,200	24,200
Wayne	20	950	19,000	23	1,400	32,200
Wells				2	1,200	2,400
White				4	1,000	4,000
Whitley						
Total	6,975		5,117,540	6,578		8,937,400
Average		733			1,358	

HORSES, 1896.

TABLE No. 10.

Statement Showing by Counties the Number of Horses in 1896, and the Number that Died; Also the Same for 1895.

COUNTIES.	Number of Horses in 1896.	Number Died.	Number of Horses in 1895.	Number Died.
Adams	7,668	170	7,556	237
Allen	12,549	388	12,904	354
Bartholomew	7,525	240	7,394	217
Benton	18,414	267	7,539	254
Blackford	4,334	116	3,912	78
Boone	12,002	325	10,729	334
Brown	3,124	104	2,868	89
Carroll	8,384	299	8,384	328
Cass	8,876	241	9,995	268
Clark	5,797	243	5,511	243
Clay	6,967	215	6,398	255
Clinton	10,608	272	11,055	319
Crawford	3,122	79	2,349	105
Daviess	9,481	299	8,573	371
Dearborn	4,250	140	3,702	116
Decatur	7,078	218	6,004	182
Dekalb	6,928	153	6,875	553
Delaware	10,146	284	8,487	305
Dubois	4,537	146	4,880	216
Elkhart	10,015	227	11,159	209
Fayette	4,268	128	4,492	183
Floyd	2,124	79	1,935	94
Fountain	7,745	319	12,099	322
Franklin	6,267	191	6,358	222
Fulton	6,302	112	6,372	238
Gibson	7,994	254	7,925	351
Grant	9,956	235	9,257	298
Greene	8,742	365	6,762	280
Hamilton	10,190	351	9,651	311
Hancock	8,070	209	7,838	266
Harrison	7,508	279	8,070	267
Hendricks	9,148	278	9,675	350
Henry	9,515	351	9,849	323
Howard	9,281	293	8,469	308
Huntington	8,558	259	8,132	226
Jackson	5,504	159	5,670	243
Jasper	8,620	526	6,829	314
Jay	8,985	219	7,879	228
Jefferson	6,833	342	7,052	348
Jennings	4,964	165	3,961	184

TABLE No. 10—Continued.

COUNTIES.	Number of Horses in 1896.	Number Died.	Number of Horses in 1895.	Number Died.
Johnson	8,314	273	8,849	320
Knox	7,654	290	7,154	297
Kosciusko	9,690	222	11,056	210
Lagrange	7,155	118	6,342	161
Lake	7,216	369	7,483	311
Laporte	9,134	436	8,843	253
Lawrence	6,158	160	5,690	180
Madison	11,654	230	10,970	299
Marion	15,602	1,041	8,865	386
Marshall	8,362	199	8,857	276
Martin	4,288	134	3,810	118
Miami	8,967	243	8,457	294
Monroe	5,755	261	4,055	145
Montgomery	12,675	466	7,861	420
Morgan	7,672	265	7,624	304
Newton	6,461	293	5,909	247
Noble	7,915	141	7,412	160
Ohio	1,287	25	1,241	...
Orange	5,369	119	5,227	182
Owen	5,756	119	5,690	202
Parke	9,370	315	7,673	290
Perry	3,838	133	6,614	125
Pike	4,788	187	5,537	232
Porter	7,661	289	6,602	211
Posey	4,946	240	4,864	261
Pulaski	7,031	209	6,090	270
Putnam	10,932	346	8,813	350
Randolph	10,740	295	10,123	379
Ripley	6,208	147	5,577	230
Rush	9,553	418	10,406	294
Scott	2,888	74	2,775	114
Shelby	9,841	357	10,089	404
Spencer	6,316	264	5,889	255
Starke	3,003	119	2,356	121
Steuben	5,647	138	6,096	148
St. Joseph	9,843	383	8,619	304
Sullivan	10,506	357	9,463	330
Switzerland	3,863	112	3,937	125
Tippecanoe	11,387	394	3,451	377
Tipton	6,862	245	6,259	161
Union	3,008	140	3,379	80
Vanderburgh	5,053	204	5,093	143
Vermillion	5,402	178	5,392	200
Vigo	10,014	359	9,349	345
Wabash	9,129	305	10,021	270
Warren	7,510	328	6,398	234
Warrick	7,278	315	5,676	314
Washington	7,373	297	7,169	126
Wayne	9,214	294	9,206	189
Wells	8,151	237	7,721	203
White	10,270	419	9,685	370
Whitley	6,001	149	6,294	168
Total	692,917	22,951	651,258	22,787

MULES, 1896.

TABLE No. 11.

Statement Showing by Counties the Number of Mules in 1896, and the Number that Died; Also the Same for 1895.

COUNTIES.	Number of Mules in 1896.	Number Died.	Number of Mules in 1895.	Number Died.
Adams.	88	6	95	2
Allen	103	1	108	5
Bartholomew	1,960	67	1,670	64
Benton.	427	19	434	18
Blackford	134	. . . . .	72	2
Boone	257	11	387	12
Brown	556	40	484	20
Carroll.	638	14	245	13
Cass	421	17	360	11
Clark	1,001	32	930	30
Clay	936	34	702	24
Clinton	210	4	190	7
Crawford	364	5	292	12
Daviess	1,973	67	1,418	47
Dearborn	514	18	339	8
Decatur	1,198	26	1,104	20
Dekalb.	44	4	56	2
Delaware	238	10	194	12
Dubois.	854	11	941	13
Elkhart	102	16	127	10
Fayette	189	15	274	10
Floyd	224	4	226	4
Fountain	586	33	763	40
Franklin.	433	20	582	42
Fulton	113	13	155	9
Gibson	2,232	68	2,066	80
Grant	350	12	298	24
Greene.	1,582	43	1,307	21
Hamilton	376	13	532	20
Hancock	203	4	208	8
Harrison.	533	31	518	19
Hendricks.	636	23	779	29
Henry	226	16	297	15
Howard	318	13	226	10
Huntington	217	8	154	3
Jackson	2,404	22	2,082	44
Jasper	363	49	231	11
Jay.	167	6	153	5
Jefferson.	825	31	779	16
Jennings.	796	10	576	12

TABLE No. 11—Continued.

COUNTIES.	Number of Mules in 1896.	Number Died.	Number of Mules in 1895.	Number Died.
Johnson	761	13	940	32
Knox	2,366	165	1,706	47
Kosciusko	161	6	168	9
Lagrange	49	...	49	3
Lake	114	5	138	...
Laporte	182	6	138	7
Lawrence	956	24	1,367	34
Madison	310	32	252	35
Marion	1,004	41	990	37
Marshall	153	12	123	24
Martin	519	29	646	24
Miami	204	12	208	12
Monroe	608	14	610	7
Montgomery	737	28	962	3
Morgan	670	44	854	28
Newton	475	34	322	28
Noble	142	...	123	3
Ohio	208	3	183	14
Orange	768	31	912	5
Owen	943	13	848	23
Parke	881	26	822	50
Perry	1,008	37	645	42
Pike	1,524	42	1,256	25
Porter	97	4	65	12
Posey	2,593	49	2,693	74
Pulaski	196	7	212	3
Putnam	1,097	33	1,006	34
Randolph	275	4	299	4
Ripley	673	11	668	30
Rush	295	9	371	13
Scott	435	6	533	10
Shelby	514	23	464	11
Spencer	2,047	58	1,624	69
Starke	133	4	76	3
Steuben	77	4	70	...
St. Joseph	147	2	112	5
Sullivan	884	27	744	66
Switzerland	589	4	527	13
Tippecanoe	541	23	381	8
Tipton	244	9	189	1
Union	177	2	187	2
Vanderburgh	2,375	76	2,620	58
Vermillion	408	19	403	11
Vigo	1,265	50	1,149	58
Wabash	164	5	193	11
Warren	592	9	514	15
Warrick	2,149	91	2,108	61
Washington	1,278	39	1,318	28
Wayne	255	17	203	13
Wells	199	2	154	5
White	506	12	453	14
Whitley	133	3	111	10
Total	60,075	2,054	56,063	1,136

COWS AND CATTLE, 1896.

TABLE No. 12.

Statement Showing by Counties the Number of Milch Cows and Number of Cattle in 1896; Also the Same for 1895.

COUNTIES.	No. of Milch Cows in 1896.	No. of Cattle in 1896.	No. of Milch Cows in 1895.	No. of Cattle in 1895.
Adams	5,859	4,934	5,713	5,183
Allen	11,344	7,381	10,576	4,313
Bartholomew	5,012	5,700	4,369	5,806
Benton	3,909	5,035	3,228	4,585
Blackford	2,538	2,336	2,194	2,262
Boone	7,106	8,899	6,832	7,932
Brown	2,280	2,783	2,266	2,249
Carroll	5,762	6,717	5,690	5,271
Cass	6,692	5,512	6,714	5,011
Clark	4,852	3,470	4,328	2,927
Clay	5,275	5,480	4,249	4,310
Clinton	6,643	6,212	6,912	7,659
Crawford	2,519	2,152	2,389	1,072
Daviess	5,959	5,653	5,355	4,911
Dearborn	4,619	6,078	4,105	2,918
Decatur	4,743	6,181	8,953	1,783
Dekalb	5,902	4,025	5,370	4,072
Delaware	6,374	5,937	6,818	5,729
Dubois	4,215	4,211	4,327	6,004
Elkhart	7,943	8,195	7,716	5,075
Fayette	2,777	3,426	3,645	4,280
Floyd	2,374	1,535	2,155	856
Fountain	4,304	5,664	6,207	12,622
Franklin	5,442	4,425	5,607	5,271
Fulton	5,251	4,123	5,051	5,004
Gibson	5,223	5,886	5,273	4,568
Grant	6,904	6,074	6,105	5,964
Greene	5,811	8,735	4,928	6,758
Hamilton	7,441	6,744	6,093	7,988
Hancock	4,941	4,937	5,033	4,591
Harrison	5,445	3,504	5,551	3,077
Hendricks	6,095	10,703	6,401	10,980
Henry	6,191	7,569	6,033	6,836
Howard	5,276	5,043	5,179	5,173
Huntington	7,015	6,765	6,392	6,474
Jackson	4,702	5,946	4,720	4,709
Jasper	4,561	8,360	4,400	7,979
Jay	6,289	6,037	5,225	5,156
Jefferson	5,097	3,935	5,492	3,633
Jennings	4,239	3,832	3,301	3,293

TABLE No. 12—Continued.

COUNTIES.	No. of Milch Cows in 1896.	No. of Cattle in 1896.	No. of Milch Cows in 1895.	No. of Cattle in 1895.
Johnson	5,418	7,598	5,133	6,147
Knox	4,767	7,287	4,717	5,576
Kosciusko	7,907	6,403	7,711	6,818
Lagrange	5,589	4,691	5,331	3,755
Lake	9,394	6,226	9,199	5,813
Laporte	9,167	6,300	8,408	4,830
Lawrence	4,632	7,798	3,809	6,221
Madison	7,636	6,745	6,615	5,890
Marion	9,624	4,725	7,782	4,883
Marshall	6,978	4,885	6,905	11,266
Martin	3,138	3,556	2,887	3,258
Miami	6,420	6,430	6,239	6,844
Monroe	3,729	4,775	2,859	3,737
Montgomery	6,545	10,263	5,763	8,790
Morgan	4,447	7,511	4,351	6,270
Newton	2,927	5,889	2,955	6,204
Noble	6,507	6,166	5,551	6,099
Ohio	1,196	1,189	1,179	1,668
Orange	3,809	3,679	3,525	3,800
Owen	4,270	6,184	4,585	5,569
Parke	5,283	8,117	4,713	7,694
Perry	2,944	1,999	2,850	2,362
Pike	2,960	3,399	3,173	2,165
Porter	8,882	5,820	8,361	4,616
Posey	3,540	3,784	3,421	3,784
Pulaski	5,806	5,857	5,715	5,914
Putnam	5,692	13,016	4,914	10,780
Randolph	7,059	6,521	7,117	6,479
Ripley	7,062	4,237	6,521	4,691
Rush	4,891	6,066	4,774	6,144
Scott	2,025	1,298	2,208	2,597
Shelby	5,514	4,968	5,506	5,231
Spencer	3,788	2,950	3,733	2,378
Starke	2,828	2,204	2,661	2,114
Steuben	3,983	3,621	2,886	1,703
St. Joseph	7,605	3,799	7,487	3,060
Sullivan	5,906	7,768	4,917	5,076
Switzerland	3,038	1,621	2,860	1,520
Tippecanoe	5,614	5,716	5,435	5,471
Tipton	4,301	4,308	3,705	4,601
Union	2,182	2,687	2,452	3,228
Vanderburgh	4,311	1,215	4,425	1,643
Vermillion	2,848	3,889	2,866	9,501
Vigo	5,770	4,473	5,334	4,315
Wabash	6,481	6,191	6,739	7,233
Warren	3,281	6,070	3,186	4,271
Warrick	4,891	3,123	4,123	2,564
Washington	6,029	6,056	5,819	4,553
Wayne	6,721	6,657	6,313	7,355
Wells	6,163	5,419	6,304	4,636
White	5,851	8,545	5,932	7,500
Whitley	4,792	5,122	5,028	6,188
Total	486,026	495,066	468,013	459,449

SHEEP, 1896.

TABLE No. 13.

Statement Showing by Counties the Number of Sheep and Lambs in 1896, Pounds of Wool Clipped, and the Number Killed by Dogs and the Number that Died of Disease.

COUNTIES.	Number of Sheep in 1896.	Number of Lambs in 1896.	Pounds of Wool Clipped in 1896.	Number of Sheep Killed by Dogs in 1896.	Number of Sheep Died in 1896.
Adams	11,425	7,334	53,318	102	596
Allen	18,374	11,429	101,111	513	859
Bartholomew	5,489	3,711	32,747	196	382
Benton	1,604	801	10,591	37	82
Blackford	7,330	3,575	32,706	289	376
Boone	7,465	5,217	45,505	419	609
Brown	5,679	2,835	28,636	96	246
Carroll	7,400	4,910	43,678	184	488
Cass	13,445	9,758	82,347	369	890
Clark	3,970	3,015	18,808	233	220
Clay	5,296	3,282	25,410	247	298
Clinton	5,983	3,834	31,763	98	326
Crawford	4,784	3,219	23,966	114	301
Davies	7,714	5,363	38,767	556	587
Dearborn	3,674	2,940	19,051	278	203
Decatur	5,554	3,897	28,317	536	377
Dekalb	16,852	9,777	87,302	213	759
Delaware	11,868	7,659	69,932	398	735
Dubois	4,400	3,407	20,928	206	389
Elkhart	15,457	10,225	74,896	227	829
Fayette	3,717	2,402	22,968	382	227
Floyd	566	425	2,508	36	33
Fountain	12,783	7,911	74,016	263	894
Franklin	6,314	4,849	36,184	382	417
Fulton	11,800	8,167	71,305	304	735
Gibson	5,551	3,467	32,827	193	406
Grant	13,079	7,701	66,393	508	594
Greene	17,248	8,107	88,906	438	828
Hamilton	5,829	3,541	35,428	265	443
Hancock	5,067	2,340	28,922	179	381
Harrison	5,150	2,807	24,778	333	607
Hendricks	10,527	7,142	53,893	327	693
Henry	6,603	3,986	41,229	193	523
Howard	2,979	2,040	17,986	117	181
Huntington	10,349	7,482	62,860	389	554
Jackson	4,627	3,030	24,756	209	311
Jasper	2,740	2,249	31,798	65	115
Jay	11,676	9,266	67,496	393	579
Jefferson	6,422	4,594	32,490	233	371
Jennings	7,559	6,110	37,901	367	389

TABLE No. 13—Continued.

COUNTIES.	Number of Sheep in 1896.	Number of Lambs in 1896.	Pounds of Wool Clipped in 1896.	Number of Sheep Killed by Dogs in 1896.	Number of Sheep Died in 1896.
Johnson	5,262	3,418	31,531	108	279
Knox	5,439	2,976	28,982	111	569
Kosciusko	22,717	16,218	129,531	207	1,522
Lagrange	26,608	16,884	161,386	68	1,198
Lake	1,650	861	9,342	34	39
Laporte	9,186	5,430	54,065	481	639
Lawrence	6,820	4,628	35,322	298	321
Madison	5,748	3,904	31,820	351	507
Marion	4,180	2,861	23,073	129	211
Marshall	14,966	10,856	82,553	161	1,024
Martin	12,031	6,951	54,297	193	797
Miami	8,485	5,993	51,473	286	555
Monroe	11,581	6,760	58,015	249	555
Montgomery	17,606	10,290	93,970	252	1,152
Morgan	5,301	3,778	27,571	56	281
Newton	1,496	667	8,212	57	90
Noble	25,028	19,342	145,822	183	1,264
Ohio	2,400	1,421	11,641	47	108
Orange	8,405	5,506	41,690	310	505
Owen	15,178	7,936	76,963	746	683
Parke	15,330	8,273	94,482	446	969
Perry	3,405	1,781	13,411	290	383
Pike	4,547	3,407	24,259	394	451
Porter	4,445	3,306	28,169	94	177
Posey	2,340	2,115	10,245	82	197
Pulaski	5,775	4,476	33,755	140	421
Putnam	11,291	5,724	55,721	324	657
Randolph	6,340	4,222	43,028	127	451
Ripley	4,964	3,665	25,523	233	288
Rush	6,838	4,564	40,604	265	658
Scott	1,568	1,061	7,623	188	77
Shelby	3,790	2,527	25,599	219	361
Spencer	2,615	1,806	12,408	143	224
Starke	1,372	814	8,021	45	94
Steuben	29,191	12,840	156,680	47	1,090
St. Joseph	8,840	5,858	53,925	274	678
Sullivan	13,550	8,756	66,224	376	1,230
Switzerland	5,188	3,552	23,995	110	271
Tippecanoe	6,797	3,735	37,368	193	651
Tipton	4,399	3,683	24,741	236	242
Union	3,405	2,229	21,378	146	211
Vanderburgh	756	611	3,900	13	79
Vermillion	3,005	1,453	20,596	44	186
Vigo	2,901	1,800	15,264	232	188
Wabash	11,789	9,603	74,465	333	804
Warren	5,832	3,195	38,255	192	259
Warrick	5,032	3,087	23,565	300	405
Washington	10,661	8,100	54,934	189	690
Wayne	4,722	3,272	30,984	145	346
Wells	10,828	8,038	63,962	183	562
White	3,381	2,494	19,626	84	186
Whitley	13,684	10,711	78,495	136	730
Total	741,743	482,221	4,075,275	21,365	45,308

HOGS, 1896

TABLE No. 14.

Statement Showing by Counties the Number of Pigs and Hogs in the Hands of the Farmers in 1896, and the Number that Died; also the Same for 1895.

COUNTIES.	Number of Pigs in 1896.	Number of Hogs in 1896.	Number Died.	Number of Pigs in 1895.	Number of Hogs in 1895.	Number Died.
Adams	16,070	21,134	3,714	14,595	19,428	2,704
Allen	18,742	24,753	4,091	16,203	21,017	2,619
Bartholomew	13,286	21,348	4,014	12,813	15,935	1,787
Benton	5,738	8,221	8,342	8,898	11,102	3,278
Blackford	8,911	8,931	1,839	8,178	7,687	2,804
Boone	29,132	34,177	19,934	31,340	34,498	6,130
Brown	3,638	5,643	376	3,690	4,316	616
Carroll	24,455	27,848	7,170	18,209	19,684	4,482
Cass	16,754	18,425	3,332	14,882	16,209	1,464
Clark	7,656	10,262	1,037	4,836	8,029	1,070
Clay	13,068	16,173	4,230	10,877	14,359	2,101
Clinton	22,430	25,242	16,476	25,202	39,465	5,793
Crawford	3,059	5,107	234	2,290	5,553	301
Daviess	12,067	23,096	7,411	12,441	21,367	5,400
Dearborn	3,156	4,372	620	4,712	5,467	1,274
Decatur	14,461	18,794	2,930	15,834	18,942	1,448
Dekalb	12,994	14,431	2,549	11,907	12,779	1,152
Delaware	25,443	26,206	2,550	21,720	25,841	2,200
Dubois	9,206	12,137	2,833	8,492	11,436	2,980
Elkhart	10,146	14,668	1,910	11,338	13,508	1,561
Fayette	8,815	13,361	4,698	10,291	13,452	3,143
Floyd	1,416	2,965	343	1,117	2,285	252
Fountain	17,661	18,459	8,761	17,472	18,420	7,573
Franklin	9,555	13,325	2,317	10,484	12,693	2,616
Fulton	10,244	12,904	1,371	10,620	12,110	1,166
Gibson	16,977	23,878	14,345	14,164	21,858	12,839
Grant	25,138	26,123	7,743	25,342	28,318	3,887
Greene	16,320	24,233	5,816	13,161	19,043	2,858
Hamilton	26,636	26,391	17,863	23,560	26,305	8,512
Hancock	15,574	20,632	10,666	17,553	26,287	3,643
Harrison	7,950	15,352	1,220	7,566	13,987	1,701
Hendricks	27,825	28,186	11,058	26,338	25,025	5,678
Henry	28,110	20,396	28,260	28,336	29,303	3,613
Howard	21,322	21,582	10,312	20,131	19,487	10,469
Huntington	16,943	21,012	6,343	18,286	27,780	3,104
Jackson	11,393	22,203	2,199	8,949	15,881	1,343
Jasper	6,148	7,613	5,176	4,219	6,548	2,656
Jay	17,533	19,788	2,843	15,135	20,558	3,107
Jefferson	5,542	10,839	913	6,660	10,620	873
Jennings	6,124	10,030	852	4,636	6,958	795

TABLE No. 14—Continued.

COUNTIES.	Number of Pigs in 1896.	Number of Hogs in 1896.	Number Died.	Number of Pigs in 1895.	Number of Hogs in 1895.	Number Died.
Johnson	17,481	22,545	14,126	18,161	23,426	5,004
Knox	15,176	16,111	22,800	13,868	18,141	21,287
Kosciusko	16,790	19,541	2,033	14,121	15,662	2,842
Lagrange	11,537	14,405	1,026	9,454	10,808	957
Lake	5,160	7,879	2,051	4,335	6,181	1,312
Laporte	7,885	12,447	3,770	7,064	12,203	1,386
Lawrence	8,326	11,762	1,510	7,168	11,573	959
Madison	26,262	25,871	7,787	23,358	28,003	3,529
Marion	13,184	13,662	6,624	10,073	14,593	5,578
Marshall	14,588	18,326	2,876	13,397	16,688	1,784
Martin	5,580	8,885	1,185	4,681	7,291	911
Miami	17,979	21,054	3,649	16,560	21,575	3,404
Monroe	6,504	10,067	1,780	5,067	6,696	1,109
Montgomery	29,651	28,783	37,853	13,519	35,931	13,313
Morgan	14,788	21,444	9,142	14,956	21,874	3,208
Newton	3,802	5,943	7,032	5,652	6,355	1,117
Noble	16,242	15,103	1,269	13,064	13,827	1,429
Ohio	1,081	2,148	201	1,247	1,748	186
Orange	7,184	12,432	615	5,777	10,754	644
Owen	8,336	12,723	3,852	9,081	13,903	1,978
Parke	16,210	19,870	8,104	13,883	21,121	4,392
Perry	4,556	7,377	934	3,424	6,814	633
Pike	10,574	13,980	8,759	9,196	13,674	3,050
Porter	7,475	8,467	1,697	6,968	6,486	848
Posey	9,018	12,735	11,000	8,081	11,929	12,777
Pulaski	6,878	9,350	1,642	4,945	5,625	160
Putnam	24,453	20,229	7,922	24,133	25,465	4,186
Randolph	28,664	33,377	4,614	26,105	31,836	3,262
Ripley	7,168	9,481	1,039	6,471	9,136	966
Rush	23,927	24,451	36,717	30,257	38,556	2,661
Scott	3,410	5,152	466	2,860	3,882	485
Shelby	17,953	18,329	19,378	20,898	21,949	3,038
Spencer	6,800	13,057	1,312	5,909	11,076	1,233
Starke	1,842	2,851	981	1,372	2,117	148
Steuken	10,716	10,889	435	11,112	10,852	594
St. Joseph	6,447	10,036	1,886	7,119	11,130	1,328
Sullivan	16,291	18,407	26,169	17,287	21,723	3,382
Switzerland	2,548	4,567	249	2,365	4,345	606
Tippecanoe	16,997	18,000	9,776	15,399	19,967	3,289
Tipton	22,282	22,181	9,151	21,614	22,151	1,423
Union	11,506	11,291	2,615	8,558	10,396	1,217
Vanderburgh	3,807	5,338	1,683	4,992	5,684	1,268
Vermillion	7,132	9,182	6,840	8,085	11,531	1,971
Vigo	10,503	14,196	6,191	9,957	12,709	1,905
Wabash	16,205	18,500	4,146	17,546	18,195	5,660
Warren	12,524	11,834	16,727	14,000	18,298	2,893
Warrick	8,733	15,599	1,906	7,410	12,313	1,653
Washington	11,408	17,529	1,485	9,519	15,259	1,025
Wayne	18,990	21,272	4,313	24,158	21,401	3,541
Wells	21,596	25,914	2,792	19,451	23,356	1,733
White	12,260	14,836	3,220	8,080	12,370	2,743
Whitley	11,802	12,651	2,267	10,151	10,570	1,962
Total	1,205,916	1,472,332	580,260	1,159,939	1,452,715	278,143

FARMS AND PRODUCTS.

TABLE 15.

*Table Giving Number of Farms and Farm Products by Decades
from 1840—From United States Census.*

	1840.	1850.	1860.	1870.	1880.	1890.
No. farms.		93,896	131,826	161,289	194,013	198,167
Acres improved		5,046,543	8,242,183	10,104,279	13,933,738	15,107,482
Acres unimproved		7,746,879	8,146,109	8,015,369	6,487,245	5,255,034
Value land and im- provements.		\$136,385,173	\$356,712,175	\$634,804,189	\$635,236,111	\$754,789,110
Value implem'ts and machinery		\$6,704,444	\$10,457,897	\$17,676,591	\$20,476,988	\$21,172,255
Value live stock		\$23,478,566	\$41,855,539	\$43,776,782	\$71,068,738	\$83,241,422
Value products.				\$122,914,302	\$114,707,082	\$94,759,262
Value fertilizers used					\$340,502	\$777,727
No. horses	241,036	314,291	520,677	497,683	581,444	720,035
No. mules and asses	with horses	8,599	28,893	43,259	51,780	59,644
No. milch cows.	with cattle	284,554	364,553	393,736	494,944	579,287
No. working oxen	with cattle	40,221	117,487	14,088	3,970	6,563
No. other cattle		619,980	588,144	618,360	584,346	926,058
No. sheep.		675,982	991,175	1,652,680	1,100,511	1,091,133
No. swine.		1,623,608	2,261,776	3,099,110	3,186,419	3,320,817
Tons hay		178,029	412,280	622,426	1,078,768	1,361,083
Pounds wool		1,237,919	2,610,287	2,552,318	5,029,023	6,167,498
Pounds tobacco.		1,820,306	1,044,620	7,993,378	9,321,392	10,710,297
Pounds butter		742,269	12,881,335	18,306,657	23,915,385	37,377,797
Pounds cheese	with butter	824,564	801,795	283,407	367,561	550,841
Bushels wheat		4,049,375	6,214,458	16,848,367	27,747,222	47,284,858
Bushels corn		28,155,867	2,964,363	71,588,919	51,094,538	115,482,300
Bushels oats		5,981,605	5,635,614	3,317,431	8,540,409	15,599,518
Bushels barley		28,015	45,483	482,245	366,262	382,835
Bushels rye.		129,621	78,792	463,185	457,468	308,105
Bushels potatoes.		1,525,794	2,285,048	4,166,163	5,549,749	6,477,176
Gallons milk sold				936,983	6,723,840	1200,510,797
Poultry, numbers ex- cept 1840	\$357,597				6,848,011	13,594,793
Eggs, dozens					28,823,819	48,621,660
Value orchard prod- ucts.	\$110,055	\$324,940	\$1,258,942	\$2,858,086	\$2,758,959	1
Value garden prod- ucts.	\$31,212	\$72,864	\$546,153	\$197,479	\$578,413	\$842,396

* For 1870, "betterments" included.

† 1890, all produced.

‡ 1890, different fruits given in quantities

METEOROLOGICAL TABLES.

TABLE I.

Monthly and Annual Meteorological Summaries for 1896 as deducted from the Records of Observations made by the Weather Bureau at Indianapolis, Ind. Appropriate headings show the nature of the data in the columns immediately underneath.

1896. MONTHS.	Mean Barometer Reduced to sea Level—Inches.	Mean Temperature—Degrees.	Relative Humidity—Per Cent.	Maximum Temperature—Degrees.	Minimum Temperature—Degrees.	Prevailing Direction of Wind.	Number of Clear Days.	Number of Partly Cloudy Days.	Number of Cloudy Days.	Average Cloudiness During the Month. Scale 0 to 10.	Number of Days on which 0.01 Inch or More of Precipitation Fell.	Total Amount of Precipitation—Inches.	Number of Days on which Min. Temp. Fell Below Freezing.
January . . .	30.504	30.0	80	55	-5	SE	5	9	17	7.3	15	1.60	25
February . . .	30.018	32.4	78	70	-5	SW	5	10	14	6.8	14	2.47	21
March . . .	30.114	72.7	73	68	12	NW	6	12	13	6.1	14	3.06	24
April . . .	30.092	60.0	60	87	26	SE	9	12	9	5.5	10	1.27	...
May . . .	29.996	70.8	62	92	52	SW	10	10	10	5.2	10	3.56	...
June	29.994	72.3	65	94	52	SW	7	14	9	5.6	9	3.09	...
July . . .	30.042	75.9	68	■	54	■NW	8	17	6	5.4	15	5.72	...
August . . .	30.058	74.7	69	96	50	NW	14	12	5	4.2	8	3.91	...
September . .	30.042	61.2	73	92	37	NE	6	14	10	5.8	13	8.17	...
October . . .	30.084	52.2	68	78	29	NW	19	6	6	3.5	6	1.65	...
November . . .	30.188	44.6	73	71	19	S	8	12	10	5.8	15	4.10	10
December . .	30.226	36.1	71	61	12	S	5	14	12	6.4	6	1.13	16
Annual means.	30.086	54.1	68.2	80.2	27.0	SW				5.6	...	...	.
Annual totals .	. .	. .	. .	. .	. .	. .	102	142	121	. . .	135	39.84	98

TABLE II.

Daily and Monthly Mean Temperature of Indianapolis, Indiana, for 1896. The Daily Means Were Made by Adding the Maximum and Minimum Temperature of Each Day Together and Dividing the Sum by Two. The Thermometers are 76.4 Feet Above Ground and Exposed in a Standard Shelter of the Weather Bureau Pattern.

DATE.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	22	44	28	46	68	66	76	77	64	58	56	19
2	36	35	29	35	66	64	79	74	70	50	60	22
3	6	37	29	36	66	70	80	74	66	52	61	26
4	2	34	32	42	70	76	80	80	62	55	57	36
5	10	37	34	51	72	80	75	83	67	59	42	47
6	25	36	44	46	70	82	74	81	57	53	46	48
7	36	33	32	40	72	82	66	80	62	48	41	44
8	24	30	32	36	74	72	68	86	67	44	31	41
9	32	28	39	49	76	63	68	87	75	48	32	41
10	30	36	40	48	80	64	74	86	78	58	44	48
11	32	32	29	68	77	68	78	84	78	56	44	46
12	33	34	18	72	76	64	80	76	81	54	40	52
13	28	33	20	68	76	65	81	79	76	51	30	48
14	22	34	26	64	69	70	83	80	78	56	42	38
15	23	40	30	68	67	72	76	81	70	58	54	34
16	28	22	30	75	66	69	68	75	69	51	62	20
17	38	18	34	76	73	71	68	68	70	44	64	35
18	38	26	35	76	68	72	71	70	68	38	56	36
19	30	13	33	66	68	75	74	62	54	45	40	30
20	31	2	23	71	68	80	73	63	52	48	36	28
21	32	12	40	60	72	80	78	70	58	42	42	26
22	34	28	41	52	72	74	59	82	52	53	36	34
23	45	41	30	56	70	70	76	66	49	44	46	28
24	35	41	30	70	75	76	69	68	58	42	56	22
25	32	34	46	65	78	80	70	71	62	46	61	24
26	28	46	44	69	74	76	80	70	70	54	62	32
27	30	55	36	71	70	70	86	64	58	61	42	36
28	31	43	51	74	64	73	80	61	52	68	20	36
29	42	34	59	74	64	72	84	68	53	67	18	40
30	45	...	57	70	70	72	82	70	53	60	17	46
31	48	...	57	...	64	...	77	70	...	52	...	51
Mean	30	32.4	35.9	59.9	70.8	72.0	75.8	74.7	64.3	52.1	44.6	36.3

TABLE III.

*Daily and Monthly Precipitation at Indianapolis, Ind., for 1896,
the Rain Gauge 129.3 Feet Above Ground Until September 1,
Then 146 Feet.*

DATE.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	T	.02	.26	.01	.00	T	.00	.50	.00	.00	.00	.00
2	T	.26	.00	.00	.20	.00	.00	.60	.00	.00	.00	.00
3	.02	.35	.00	.00	.00	.02	.00	.00	.82	.00	.00	.00
4	T	.10	.00	.00	.00	.00	.08	.00	.00	.00	.21	.00
5	.05	.00	T	.00	T	.00	.01	.00	.09	.00	.46	.00
6	.01	.00	.22	.02	.00	.00	.19	.07	.00	.84	.00	.00
7	.00	T	.61	.00	.00	.00	.00	1.08	.00	.00	.03	T
8	.00	.01	.03	.10	.00	1.20	.00	.00	.00	.00	T	.37
9	.03	.12	.00	.34	.00	.16	.05	.00	.01	.00	T	.01
10	.00	T	.02	.00	.00	.00	.00	.00	.00	.00	.52	.00
11	.00	.00	.05	.00	.28	.00	.00	.00	.00	.00	.85	.00
12	.00	.20	.04	.00	.00	.02	.00	.61	.00	.25	.01	.00
13	.00	.71	T	.01	.00	.25	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.02	T	.00	.04	.00	.43	.00	.00	.28
15	.03	.04	.26	.00	.00	1.02	.04	.00	.44	.00	.00	.24
16	.01	.01	T	.00	.19	.00	T	.18	T	.00	.00	.00
17	.01	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00	.00
18	.03	.06	.30	.00	.28	.00	.00	.00	.05	T	.05	.06
19	.01	.09	.45	.02	1.17	.00	1.02	.00	2.29	T	.10	.00
20	.04	.00	.00	.00	T	.01	1.97	.00	.00	T	T	.00
21	.01	.00	.00	.38	.18	.00	.02	.05	.00	.00	.55	T
22	.08	.00	T	.00	T	T	.01	.31	.00	.00	.00	T
23	.48	.24	.28	.34	.00	.38	.18	1.11	.00	.06	.21	.00
24	.63	.00	.00	.01	.00	.03	1.10	.00	.00	.00	.17	T
25	.02	.00	.00	.00	1.09	.00	.00	.00	.01	.00	.04	.00
26	.01	.00	.24	.00	.01	T	.00	.00	T	.00	.01	.00
27	.00	.00	.00	.00	T	T	.00	.00	1.33	.00	1.09	.00
28	.00	T	.02	.00	.03	.00	.41	.00	1.24	.00	.00	.00
29	.00	.24	.31	.00	.00	.00	.42	.00	.42	.01	.00	.05
30	.00	.00	.02	.00	.00	.00	.18	.00	1.03	.48	.00	T
31	.19	.00	.00	.00	.08	.00	.00	.00	.00	.00	.00	.00
Mean	.052	.085	.099	.042	.115	.103	.185	.126	2.72	.053	.140	.036

"T" indicates traces of precipitation (less than 0.01 inch).

TABLE IV.

Highest and Lowest Temperature (in Degrees Fahrenheit) at Indianapolis, Indiana, During Each of the Periods 1873-1896, Inclusive. Weather Bureau Observations.

MONTH.	1873.		1874.		1875.		1876.		1877.		1878.		1879.		1880.		1881.		1882.		1883.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
January	60	-13	63	1	44	-18.5	69	9	58	-11	54	-2	57	-22	66	20	47	-6	61.5	7	45	-11
February	63	1	59	17	55	-8	66	-3	63	20	61	18	58	-1	65	14	59	1	65	15	72	4
March	61	2	72	20	77	9	72	11	73	9	72	23	74	15	70	21	62	18	70.5	24	69.4	12
April	81	32	71	27	79	19	77	29	80	28	80	35	82	21	88	27	78	20	80	24	85.3	30.4
May	86	47	89	40	88	34	86	33	88	31	81	35	87	36	85	40	86	44	80.5	37	82.8	35
June	94	62	96	50	91	51	91	51	89	45	91	50	91	47	91	54	92	48	94	45	89	50.8
July	91	60	97	58	92	63	93	61	90	54	96	58	96	58	93.5	55	101	57	89	53	92	56.8
August	96	51	95	56	87	51.5	89	48	89	57	92	53	93	53	94	51	101	55.5	90	52	91	53
September	87	42	90	41	90	35	88	42	85	42	88	44	80	38	89	41	94.5	48	85	42	87	40.4
October	76	25	78	28	75	28	75	26	83	35	81	23	86	30.5	78	31	80	39	79	35.5	81	35
November	59	13	71	-2	61	14	73	18	61	9	65	25	75	28.5	63	-5	63	10	72	22	65	10
December	62	12	61	12	68	-1	47	-15	67	20	48	-12	64	55	56	-13	63	14	57	-10	62	9

MONTH.	1884.		1885.		1886.		1887.		1888.		1889.		1890.		1891.		1892.		1893.		1894.		1895.		1896.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
January	56.8	-25	51.7	-11.3	55.3	-15	64.4	-11.8	59.8	-6	58	10	70	4	58	14	54	-5	63	-15	60	-7	58	-13	55	-5
February	65.2	1.6	59	-6	54.5	-4.2	66.2	10.5	59.8	-2.1	64	-1	69	14	61	-2	61	11	64	0	66	5	68	-14	70	-5
March	69.5	5	63.8	3.2	75.9	15.6	69.6	15.8	69	8.8	71	22	64	8	65	8	69	9	75	12	80	12	82	14	68	12
April	80.5	31.4	78.3	27.8	84	24.5	85	22.4	83.3	30.9	80	35	78	29	84	25	82	27	81	30	86	31	85	31	87	26
May	84	40.6	87.7	35.3	87.1	39.1	89	49	86.2	36	86	41	87	39	86	36	87	41	88	40	89	35	96	33	92	52
June	92.8	54.7	90.1	41.1	89	46.9	90	49.4	96.4	45.3	89	57	97	50	94	54	94	50	93	54	96	54	100	54	94	52
July	90	55.2	94.5	47.5	100.8	58.6	99	58.6	94.8	57.5	92	51	97	46	94	52	97	52	97	56	97	50	94	49	96	54
August	89	50.2	95.1	47.7	99	49.2	99	49.2	97.5	48.9	91	39	96	40	94	48	94	50	95	47	99	40	100	53	98	50
September	90.3	44.8	83.8	38.4	90.2	43.3	93.1	34	87.9	33.7	90	29	87	33	93	31	88	42	94	38	95	33	94	35	92	37
October	87	31.2	82.3	31.7	82.4	31.7	82.4	22.3	78.4	32	80	12	84	27	85	26	85	28	84	26	83	23	78	22	78	29
November	69.8	12.3	69.8	23.7	71.6	16.5	73.5	3.8	76	25.7	67	7	68	12	65	7	62	14	69	8	69	18	73	17	71	10
December	60.7	12.3	56.3	-2.1	57.7	-3.5	57	3	56	17.4	68	24	52	12	61	20	63	-4	66	6	61	2	62	9	61	12

TABLE V.

Annual Means for the Years 1872 to 1896, Arranged for Comparative Purposes, as Compiled from the Records of the U. S. Weather Bureau, Department of Agriculture, at Indianapolis, Ind.

YEAR.	Mean Barometer Reduced to Sea Level—Inches.	Mean Temperature—Degrees.	Mean Relative Humidity—Per Cent.	Maximum Temperature During the Year—Degrees.	Minimum Temperature During the Year—Degrees.	Prevailing Direction of Wind.	No. of Clear Days.	No. of Fair Days.	No. of Cloudy Days.	Av. Amount Cloudiness—Scale, 0 to 10.	No. of Days on which 0.01 Inch or More of Precipitation Fell.	Total Amount of Precipitation.	Greatest Precipitation in any Consecutive 24 Hours—Inches.	No. of Days on which the Maximum Temperature was Below Freezing.	No. of Days on which the Minimum Temperature was Below Freezing.	No. of Days on which the Temperature was Above 90 Degrees.
1872	30.044	50.8	67.5	96.0	-11.0	SW	85	142	139	5.0	122	34.07	3.71	49	120	17
1873	30.044	52.0	69.2	95.0	-13.0	SW	97	141	127	5.0	145	52.32	2.73	38	99	9
1874	30.037	65.0	63.0	97.0	-2.0	NW	97	150	118	5.0	120	43.60	2.61	17	83	27
1875	30.005	50.5	66.1	92.0	-18.5	W	81	138	146	5.0	155	54.58	2.86	44	107	5
1876	29.997	53.2	68.1	93.0	-15.0	W	83	126	157	6.0	155	57.53	2.70	30	101	9
1877	30.008	54.0	67.2	90.0	-11.0	SW	98	141	126	5.0	139	39.08	2.07	20	84	0
1878	29.946	55.4	64.6	96.0	-12.0	SE	84	159	122	6.0	148	38.62	2.03	17	68	13
1879	30.036	53.9	64.4	96.0	-22.0	S	94	135	136	5.0	122	42.88	2.33	27	98	12
1880	30.030	54.4	65.4	94.0	-13.0	W	106	145	115	5.0	123	50.99	2.00	26	19	9
1881	30.024	54.9	67.4	101.0	-6.0	SW	100	140	125	5.0	112	48.74	4.30	28	91	31
1882	30.045	53.8	71.1	94.0	-10.0	NW	107	141	117	5.3	141	53.68	3.02	19	78	4
1883	30.059	51.8	66.2	92.0	-11.0	SW	96	157	111	5.4	164	54.12	3.71	35	106	6
1884	30.044	52.5	67.6	92.8	-25.0	S	99	144	123	5.6	159	39.99	2.16	40	91	5
1885	30.019	49.3	73.9	95.1	-11.3	SW	92	153	120	5.5	147	39.51	2.87	42	111	15
1886	30.039	51.0	71.3	94.8	-15.0	S	108	150	107	5.2	138	39.83	2.11	47	127	13
1887	30.044	52.7	66.0	100.0	-11.8	S	113	146	106	5.2	119	33.08	1.89	31	120	34
1888	30.082	50.6	68.8	97.5	-6.0	NW	113	119	134	5.1	124	41.36	2.62	36	103	17
1889	30.062	53.1	69.3	92.0	-1.0	SW	95	113	157	5.5	113	38.41	2.44	18	71	5
1890	30.066	54.0	68.6	96.9	4.4	SW	77	144	144	6.2	189	54.87	4.41	25	72	23
1891	30.066	53.5	69.0	94.0	-3.0	Cal ^m	113	108	114	5.7	145	38.23	2.86	25	80	25
1892	30.079	52.0	71.0	97.0	-5.0	NW	95	128	143	5.9	150	39.77	2.73	41	104	16
1893	30.041	52.0	68.0	97.0	-15.0	NW	113	115	137	5.6	144	39.35	1.60	44	114	28
1894	30.069	54.5	67.6	99.0	-7.0	NW	108	133	124	5.6	127	31.13	2.69	26	83	39
1895	30.076	52.1	67.7	100.0	-14.0	SW	125	124	116	5.2	126	33.54	6.80	46	108	39
1896	30.088	54.1	68.2	98.0	-6.0	S	102	142	121	5.6	135	39.84	2.34	24	98	25

TABLE VI.

Monthly Mean Atmospheric Pressure Reduced to 32° Fahrenheit and the Level of the Sea, for Each Year of the Period, 1872 to 1896, Inclusive, as Recorded at the Office of the U. S. Weather Bureau at Indianapolis, Ind.

MONTH.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.
January	30.130	30.056	30.120	30.232	30.107	30.160	30.022	30.151	30.026	30.136	30.159	30.162
February	30.008	30.044	30.099	30.129	30.070	30.156	30.117	30.112	30.049	30.092	30.101	30.283
March	30.043	30.030	30.041	29.989	29.982	30.013	29.912	30.073	30.059	29.824	30.088	30.557
April	29.960	29.896	30.016	26.064	29.978	29.898	29.746	29.969	29.946	29.983	30.027	29.965
May	29.988	29.895	29.940	29.922	29.963	29.992	29.904	29.951	29.974	29.967	29.955	29.940
June	29.976	29.905	29.925	29.948	29.881	29.907	29.896	29.954	29.947	29.906	29.907	29.981
July	29.964	29.982	29.954	29.935	29.957	29.931	29.912	29.627	29.957	29.995	30.012	30.012
August	30.032	30.013	29.952	29.945	30.001	29.926	29.876	29.951	29.976	30.005	29.981	30.050
September	29.997	30.632	30.020	30.020	29.954	29.997	30.050	30.081	20.033	30.017	30.067	30.043
October	30.095	30.062	30.093	29.999	29.972	29.963	30.028	30.108	30.062	30.130	30.034	30.090
November	30.112	30.010	30.116	30.037	29.990	30.038	30.010	30.078	30.207	30.163	30.177	30.161
December	30.218	30.125	30.165	29.986	30.109	30.097	30.082	30.080	30.124	30.180	30.152	30.136

MONTH.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
January	30.188	30.156	30.053	30.031	30.250	30.056	30.211	30.084	30.146	30.064	30.151	30.085	30.204
February	30.060	30.026	30.114	30.156	30.086	30.174	30.080	30.056	30.109	30.166	30.176	30.210	30.018
March	30.040	30.085	29.975	30.055	30.121	30.004	30.086	30.037	30.084	30.065	30.084	30.068	30.114
April	29.948	30.014	30.029	30.099	30.154	30.018	30.096	30.022	30.090	29.942	30.041	29.999	30.092
May	29.956	29.909	29.925	29.974	29.940	29.974	29.936	30.092	29.945	29.926	29.966	30.056	29.996
June	30.009	30.013	29.951	29.992	29.954	30.012	29.990	29.934	29.950	29.984	30.016	30.054	29.994
July	29.918	29.964	29.983	29.975	30.047	29.988	30.015	30.028	30.078	29.990	30.034	30.022	30.042
August	30.034	29.946	29.982	29.994	30.041	30.098	30.063	30.000	30.022	29.994	30.024	29.972	30.058
September	30.052	30.025	30.094	30.076	30.082	30.054	30.105	30.150	30.118	30.006	31.060	30.073	30.042
October	30.153	29.973	30.198	30.086	30.014	30.133	29.974	30.149	30.108	30.071	30.001	30.130	30.044
November	30.131	30.001	30.051	30.094	30.155	30.102	30.111	30.110	30.133	30.108	30.146	30.160	30.188
December	30.156	30.106	30.169	30.095	30.142	30.134	30.128	30.129	30.167	30.179	30.164	30.080	30.226

TABLE VII.

Mean Temperature and Total Monthly Precipitation for Each Month of the Period 1872 to 1896, Inclusive. Compiled from the Records of the U. S. Weather Bureau at Indianapolis, Ind.

MONTHLY MEAN TEMPERATURE IN DEGREES, FAHRENHEIT.

MONTH.	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896
Jan.	28.6	24.5	35.5	20.0	38.6	27.8	31.5	26.5	45.9	23.7	31.6	21.5	21.6	22.5	21.2	24.4	23.3	34.1	37.4	34.2	23.8	17.9	34.6	22.9	30.0
Feb.	29.6	30.8	35.5	21.2	37.0	39.2	39.0	30.1	38.7	29.8	42.3	31.0	34.7	33.0	33.4	34.6	30.5	27.0	38.8	36.6	36.4	36.4	29.4	21.7	32.4
March.	35.0	37.9	41.6	37.4	37.5	35.5	49.9	42.5	41.6	36.8	44.8	36.1	41.1	33.0	39.4	38.2	35.7	44.4	36.0	35.5	37.4	40.2	47.4	38.8	36.0
April.	55.0	51.2	45.8	49.3	52.0	53.8	85.6	52.3	55.2	47.5	53.3	50.3	50.2	51.5	54.6	52.3	52.6	53.3	53.6	55.4	50.6	52.0	54.0	55.2	60.0
May.	64.3	63.9	66.6	62.3	65.7	61.9	61.6	66.2	68.4	70.2	58.5	60.9	62.1	60.5	64.3	67.3	60.5	61.6	61.6	59.6	60.0	59.9	61.7	63.8	70.8
June.	73.0	76.7	76.2	70.8	71.9	71.5	69.9	71.4	73.3	72.9	71.6	71.5	73.2	68.8	69.2	73.8	72.9	67.8	74.6	74.6	72.8	72.8	74.6	75.0	71.8
July.	77.7	75.3	78.3	75.6	77.7	75.8	79.1	79.5	75.9	79.4	72.6	75.1	73.7	76.3	74.3	80.6	75.2	74.2	75.7	71.9	74.2	73.4	76.4	74.2	75.9
August.	75.9	74.8	75.5	70.2	75.0	73.1	75.2	72.6	75.6	79.0	73.0	70.4	72.3	70.9	72.9	73.3	71.1	71.4	71.1	72.1	74.2	73.4	74.8	76.2	74.7
Sept.	66.7	63.8	68.6	63.1	64.4	66.3	67.0	61.7	64.2	73.5	65.5	63.2	71.6	63.9	66.6	65.8	60.9	64.5	62.9	70.6	69.0	69.0	69.8	70.8	64.2
Oct.	53.3	49.8	55.0	50.8	51.1	58.2	54.0	62.3	52.9	60.2	58.8	54.8	58.3	50.4	55.3	50.2	48.5	50.8	56.0	54.6	56.4	55.7	55.9	49.4	52.2
Nov.	35.3	37.0	42.1	39.9	41.1	42.6	44.9	45.4	31.2	42.8	43.3	45.0	41.5	41.9	39.3	40.5	42.4	40.9	46.5	39.4	38.2	41.0	39.1	42.3	44.6
Dec.	23.9	37.2	35.3	41.2	22.6	45.8	26.9	35.6	24.2	40.2	30.4	31.4	29.9	32.0	25.2	30.8	34.0	46.7	33.1	40.6	30.0	32.8	35.8	34.1	36.1

TOTAL MONTHLY PRECIPITATION, IN INCHES AND HUNDREDTHS.

MONTH.	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896
Jan.	1.17	4.4	3.75	1.01	5.34	1.65	2.48	1.47	6.33	2.10	3.74	1.39	1.65	3.31	4.09	1.48	2.81	2.52	10.20	2.00	1.55	2.77	1.43	3.12	1.60
Feb.	1.0	2.85	3.17	1.88	3.34	2.2	2.16	2.36	7.28	6.4	6.24	1.1	4.23	1.4	1.51	4.61	2.45	1.29	5.98	5.77	3.53	6.16	4.90	0.86	2.47
March.	1.0	1.9	2.4	1.2	2.22	1.75	1.1	1.36	4.4	4.0	6.11	1.3	3.1	0.92	2.83	2.74	4.96	1.1	4.46	5.77	1.93	2.89	2.82	1.40	3.08
April.	2.58	1.8	4.4	1.9	5.11	3.0	2.25	5.34	6.42	2.78	7.95	4.2	4.50	2.8	3.09	3.92	4.05	2.07	4.84	2.98	6.33	8.60	2.72	1.46	1.27
May.	3.8	1.8	4.0	1.3	7.51	6.23	2.25	2.44	8.98	3.92	9.3	4.2	4.2	4.1	4.2	2.4	2.65	4.98	4.45	2.00	1.84	4.42	4.52	1.07	3.56
June.	1.1	1.28	1.8	1.12	1.48	4.1	4.2	3.71	2.67	6.97	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09
July.	1.1	1.1	1.8	1.12	5.80	4.1	4.2	3.71	1.67	9.7	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09
August.	1.1	1.1	1.8	1.12	5.80	4.1	4.2	3.71	1.67	9.7	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09
Sept.	1.1	1.1	1.8	1.12	5.80	4.1	4.2	3.71	1.67	9.7	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09
Oct.	1.1	1.1	1.8	1.12	5.80	4.1	4.2	3.71	1.67	9.7	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09
Nov.	1.1	1.1	1.8	1.12	5.80	4.1	4.2	3.71	1.67	9.7	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09
Dec.	1.1	1.1	1.8	1.12	5.80	4.1	4.2	3.71	1.67	9.7	3.1	1.2	0.4	1.82	6.1	1.41	3.34	3.98	0.97	1.00	0.83	0.83	3.76	1.49	3.09

U. S. DEPARTMENT OF AGRICULTURE.

CLIMATE AND CROP SERVICE

OF THE

WEATHER BUREAU.

WASHINGTON, D. C.)
Central Office,)

(WILLIS L. MOORE,
(Chief.

INDIANA SECTION,

C. F. R. WAPPENHANS, Section Director,
Indianapolis, Ind.

ANNUAL SUMMARY, 1896.

The annual mean temperature during 1896 was 1.4° above the normal, and a similar excess occurred in all sections of the State. Deficiencies in temperature occurred in the months of March, September and October, the greatest deficiency, 2.5° , being in the month of March. In June the mean temperature was normal, and in the other months an excess occurred. The greatest excess, 7.2° , is noted in May.

The precipitation during the year was 0.90-inch in excess of the normal, and a small excess occurred in all sections. Deficiencies of precipitation occurred in January, February, April, November and December; in the other months there occurred an excess.

Considering the seasons, we find that the mean temperature of the winter is slightly in excess of the normal and the total precipitation slightly deficient; in the spring a greater excess occurred in temperature, with a slight deficiency in precipitation. The temperature in summer was near normal, but the rainfall was very excessive (6.66 inches); the excess was greatest in July. In autumn there occurred a deficiency in temperature, with an excessive precipitation.

THE SEASONS OF 1896.

*The Year Begins With December, 1895, the Beginning of Winter, and
Ends November 30, 1896, the End of Autumn.*

MONTHS AND SEASONS.	TEMPERATURE, Degrees Fahrenheit.				PRECIPITATION, Inches.			NUMBER OF DAYS.			
	Mean.	Normal.	Departure from Normal.	Monthly range.	Total.	Normal.	Departure from Normal.	Clear.	Partly Cloudy.	Cloudy.	Rainy.
December, 1895	34.1	33.2	+0.9	56	5.50	2.92	+1.58	7	7	17	11
January, 1896	29.8	28.2	+3.6	60	1.26	2.94	-1.68	6	9	16	7
February	32.0	30.9	+1.1	69	2.14	3.48	-1.34	7	9	13	9
Winter, 1896	32.0	30.3	+1.7	62	7.90	9.34	-1.44	20	25	36	27
March	35.4	37.9	-2.5	60	3.14	3.05	+0.09	8	10	13	10
April	58.8	52.9	+5.9	63	1.81	3.50	-1.69	12	11	7	6
May	69.3	62.1	+7.2	42	4.59	4.23	+0.36	13	11	7	11
Spring, 1896	54.5	51.0	+3.5	55	9.54	10.78	-1.24	33	32	27	27
June	71.2	72.1	-0.9	43	4.29	4.03	0.26	11	11	8	10
July	75.0	74.6	+0.4	43	7.61	3.94	+3.67	12	10	9	11
August	74.8	72.1	+2.7	48	5.21	3.08	+2.13	18	8	5	7
Summer, 1896	73.6	72.9	+0.7	45	17.11	10.45	+6.66	41	29	22	28
September	63.7	65.5	-1.8	58	5.02	3.20	+1.82	10	8	12	10
October	50.7	52.8	-2.1	52	1.15	2.29	-1.14	18	7	6	5
November	44.2	42.0	+3.2	62	3.24	3.76	-0.52	9	8	13	10
Autumn, 1896	52.9	53.1	-0.2	57	9.41	9.25	+0.16	37	23	31	25
Year, 1896	53.2	51.8	+1.4	55	43.96	39.82	+4.14	131	109	126	107

EFFECT OF THE WEATHER ON THE CROPS DURING THE SEASON OF 1896.

Although the winter was less severe than the preceding one, continued drouth in the fall and winter, much freezing and thawing far into March, 1896, with but little snow to protect the wheat and other winter crops, except during the month of March, caused cereals and grasses to be only in fair condition at the end of the winter.

MARCH.—The cold weather retarded everything, but the heavy snow at times was good protection to growing crops. Wheat and barley were short, and only in fair condition, especially in the southern portion, and in some localities these crops were injured, and had to be plowed up. Rye, everywhere, was in good condition. Grass was brown, and had not started yet; much had heaved by freezing and thawing; timothy and clover in the southern portion was in fair condition, but in the northern portion most of the old clover had been frost-killed. Fruit germs were apparently safe, except peaches in some localities. The cold, much snow and frozen ground during the month retarded farm work, and not much plowing was done, except in the southern portion. Live stock wintered well, with plenty of fodder.

APRIL.—Spring advanced only slowly; cold, dry weather, with harmless frosts, checked the growth of crops at the beginning of the month; warmer weather and rains during the latter part improved everything, and vegetation advanced in a most wonderful manner. Wheat and grass at the end of the month looked better; pasturage was good, and livestock showed it; rye was in fair condition; late-sown clover was coming on nicely; early potatoes had been planted and were coming up; oats were nearly all sown and coming up, but tobacco plants had advanced less; fruit trees were filled with bloom, and also small fruit; plowing for corn had commenced and some corn had been planted. Cutworms, clover worms and potato bugs made their appearance in great numbers in some localities.

MAY.—Heavy local rains in localities at the beginning of the month were followed by hot, dry weather, and in some localities crops were suffering. Wheat, barley, rye, clover and blue grass were heading in the middle of the month; oats and potatoes were coming on nicely; meadows in localities showed the effect of the dry weather; tobacco beds were in bad condition. Plowing for corn continued, although the ground was getting dry and hard; some corn had come up. The Hessian fly and chinch bugs were injuring wheat in localities, and grasshoppers

and potato bugs were numerous. Dry weather continued until near the end of the month; then good rains improved crops. Wheat had headed, but some had to be plowed up to be replaced by corn; barley had ripened, and rye and oats were in good condition. Corn was not all planted yet; that which had come up was in healthy condition. Cutworms were doing damage in some fields. Some tobacco plants had been set out; potatoes were in fine condition and had begun to bloom; clover was nearly ready for cutting.

JUNE.—Numerous good rains at the beginning of the month, followed by warm weather, caused crops to advance well, but the ground was too wet for cultivation. Wheat was ripening, and in some localities the harvest had begun; in general, it was a poor crop. Fair crops of rye and barley were put in shock. Oats were in excellent condition, and corn was vigorous, growing rapidly and standing well under good cultivation. The army worm in localities did damage. Numerous rains and warm weather continued, and at the end of the month, too much rain having fallen in some localities, it prevented good cultivation of corn, and caused wheat to sprout, and lodged the oats. Corn continued to grow rapidly, and was tasseling in some fields. Oats were excellent and heading and turning. Gardens were in fine condition, and vegetables were growing rapidly. Melons and fruit were abundant, but peaches and apples fell off much; the blackberry crop was immense. The wheat and rye harvest and haying continued; most of the wheat and rye was in shock, and threshing had begun; clover was cut and housed, and timothy was being cut. Pasturage was in fine condition.

JULY.—In the earlier part of the month warm weather, with few local showers, was very favorable to growing crops and harvesting. At the middle of the month corn was in excellent condition, growing rapidly and standing quite high; it was "laid by" in many fields. Oats never promised better; they were ripening fast, and in the southern portion some had been cut. Beans had been planted, and potatoes were in good condition. Tobacco was looking well, but worms did damage in places. Sugar beets were making good progress. The latter part of the month much rain fell and did damage; in localities it retarded farm work, and especially harvesting; wheat, rye and oats were rotting and sprouting in shock, and hay was rotting. Threshing advanced only slowly, and plowing for winter wheat was retarded. Tobacco continued in good condition and most of it had topped. The rains were good for growing crops, with an immense crop of corn almost assured; some corn on low lands and in river bottoms was under water. The potato crop promised to be large, but because of the continued wet weather some rotted in the ground. A very large crop of tomatoes was in good condition, and vegetables were growing finely. Peaches and grapes were ripening, and home peaches were on the markets. The apple crop was small as compared with last year's crop.

AUGUST.—Warm weather and numerous light and heavy rains continued during the month, which increased injury to wheat, rye and oats in shock. In the middle of the month corn was maturing fast, and in the southern portion it was

nearly safe from frost; rain did much damage to corn by inundation. In the southern portion threshing was finished, but in the central and northern portions it had advanced but slowly. Clover cutting and hulling progressed, and a good crop of millet was ready to cut. The sorghum crop promised to be heavy in localities. Large crops of tomatoes, cabbage and beans were in good condition, and the gathering of tomatoes continued. Buckwheat promised a good yield. An unusually large crop of tobacco was cut about three weeks earlier than usual. Pears, plums and grapes were abundant. Plowing progressed only slowly because of the wet weather. The last week of the month was cooler, and no rain fell. Corn had matured fast, and much had been cut and put in shock and nearly all corn was safe from frost. On the 26th a light frost formed, but did no damage. Tobacco was nearly all in good condition. The potato crop is large, but in low lands they rotted. Buckwheat progressed well. Beans promised a large crop, with but few poor fields. Pumpkins were very abundant, and the millet crop was very fine. Threshing was all done at the end of the month, except in the northern portion, and fall plowing progressed rapidly, with the ground in good condition. A fair yield of clover was being threshed. Pasturage and stock, except sheep, were in good condition.

SEPTEMBER.—Warm, dry weather prevailed the first part of the month; about the middle of the month corn was all safe from frost; most of it was cut and in shock; much corn had been cut for fodder, as the hay crop was very short. The corn crop was of good quality and very large, the largest for years in some localities; some of the farmers wondered what they would do with all the corn. Buckwheat was safe from frost; it had filled well and was nearly ready to cut. Millet was a heavy crop in most localities. Tobacco was housed in good condition. Tomatoes were ripening fast, and the crop turned out well. Melons and vegetables were abundant. A fair crop of apples was picked and shipped; grapes and peaches were ripe and the crop large. A second crop of hay was being cut in some localities, and clover hulling continued. Near the end of the month good rains fell everywhere. Fall plowing was nearly done, and seeding progressed nicely; early sown wheat and rye had come up. A great crop of corn was secured, and the heavy frosts during the last week of the month could do no injury, except, perhaps, to a few late crops. Some timothy and hay were cut a second time in some localities. A good crop of potatoes was being dug. The tomato crop was very large and was gathered before the frosts came. Stock and pasturage were in fine condition, but many sheep died in localities.

OCTOBER.—Dry weather during the month dried up and matured the large corn crop quite rapidly, and at the end of the month much of it had been cribbed. Wheat, rye, clover and pasturage continued in good condition for the winter. In some localities more rain was needed, and in others the fly had been injuring the wheat.

NOVEMBER.—The weather continued favorable for farm work and winter crops. Wheat, grass and pasturage continued in good condition.

DECEMBER.—The weather during the month was very favorable for farm work, but the winter crops suffered from the absence of a good covering of snow and by freezing and thawing. The wheat is brown above ground, but the roots are still green, and a thick covering of snow during the remainder of the winter may improve it and sustain it for a fair crop next year.

Clear weather predominated. The thunderstorms were less numerous and less violent.

Kokomo	Howard	840	5	62.8	98	do.	6	-8	do.	4	6	39.81	9.17	do.	0.87	Oct.	16.6	110	90	157	119	sw.
Laconia	Harrison		4	52.3	97	do.	6	-12	do.	4	4	38.45	10.73	do.	0.37	do.	13.2	116	143	104	119	sw.
Lafayette	Tippecanoe	661	17	52.3	95	Sept.	12†	-8	do.	4	17	32.91	7.04	do.	0.58	Dec.	16.6	101	53	173	140	sw.
Logansport	Ca's	620	14	52.0	94	Aug.	6†	-2	Feb. 20, 21	21	4	44.62	7.65	do.	0.28	Apr.	31.0	111	135	59	172	sw.
Madison	Jefferson	460	4	56.5	96	do.	6†	-8	do.	21	15		5.89	May	0.30	do.	27.6	80	132	122	112	sw.
Marengo	Crawford	363	15	54.4		July	30	-12	Jan.	4	10	42.37	8.86	Aug.	1.26	Oct.	18.9	115	98	146	123	sw.
Marion	Grant	814	10	52.1	96	Aug. 6, 9†	7	-8	Feb.	20†	16	39.77	7.69	July	1.00	do.	33.1	123	111	97	158	sw.
Mausy	Rush	980	16	52.1	92	do.	6†	-6	do.	20†	8	32.09	6.24	May	0.77	Dec.	4.5	64	157	94	115	sw.
Mt. Vernon	Posey	410	8	58.2	102	do.	6†				1											
Northfield	Boone		2		94	do.	6†															
Princeton*	Gibson	481	14	55.5	100	do.	6, 7	2	do.	21†	14	43.86	8.55	do.	0.50	do.	42.3	66	195	104	67	sw.
Richmond	Wayne	972	1			do.	6	-5	do.	20†	1	38.69	8.35	July	0.77	Dec.	8.5	108				
Rockville	Parke	722	10	53.1	97	do.	6	-0	Feb. 20, 21	21	10	39.57	7.59	June	0.10	Apr.	22.0	89	157	96	113	sw.
Scottsburg	Scott	570	3	56.0	88	do.	8†	0	do.	20†	3	38.37	5.78	do.	0.25	do.	23.3	93	106	148	112	s.
Seymour	Jackson	610	9	54.7	98	do.	8†				9											
South Bend	St. Joseph	726	3	50.4	96	do.	8	-10	Jan.	4	3	35.47	7.39	July	0.37	Dec.	42.3	127	101	165	100	sw.
Sunman	Ripley	1018	12	52.1	92	do. 6, 10†	10†	-6	Feb. 20, 21†	21†	12	41.37	7.47	do.	0.55	Apr.	30.4	95	115	140	111	sw.
Syracuse*	Kosciusko	864	1	48.4	95	do.	9	-10	Jan.	4	1	35.50	8.83	do.	0.59	Oct.	32.8	101	156	76	134	s.
Terre Haute	Vigo	498	4	56.1	100	do.	6	-1	Feb.	20	4	37.57	7.29	do.	0.75	July	8.5	93	169	45	152	s.
Tipton	Tipton	860	1		100	do.	6	-14	Jan.	4	1											
Topeka	Lagrange		1								1											
Valparaiso	Porter	737	4	51.8	96	do.	8	-12	do.	4	4	44.31	7.56	do.	0.44	Dec.	41.8	97	122	112	132	nw.
Vevay	Switzerland	525	32	57.3	98	do.	8	0	Feb.	20†	32	42.06	7.50	do.	0.22	Apr.	32.0	93	109	114	143	sw.
Vincennes	Knox	431	3	55.6	104	do.	7, 8	0	do.	21	3	37.37	5.65	June	0.38	Dec.	13.0	84				
Warsaw	Kosciusko	826	1								1											
Washington	Daviess	484	2		98	do.	9†				2											
Worthington	Greene	540	15	54.7	96	do.	7	-2	do.	20	15	40.96	7.43	July	0.61	Apr.	18.9	113	109	149	108	sw.
South'n Portion			13	56.1	104	do.	7, 8	-12	Jan.	4	13	38.98	8.81	do.	1.41	Jan.	25.7	100	142	113	111	sw.
Central Portion			13	52.9	100	do.	6, 7	-14	do.	4	13	41.13	7.87	do.	1.24	do.	21.2	110	135	103	128	sw.
North'n Portion			13	51.0	101	do.	10	-12	do.	4	13	41.64	6.13	do.	0.71	Apr.	26.9	97	127	116	123	sw.
STATE.			15	52.8	104	do.	7, 8	-14	do.	4	15	40.66	7.61	do.	1.26	Jan.	24.4	97	134	111	121	sw.

*—Temperature data from thermometers not self-registering. †—Also in other months and on other dates preceding.

MONTHLY AND ANNUAL MEAN TEMPERATURES FOR THE YEAR 1896, WITH DEPARTURES FROM THE NORMAL.

STATIONS.	Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		October.		Nov.		Dec.		Annual.	
	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.	Temperature.	Departure.
Anderson	28.6	+2.5	31.4	+4.4	34.2	+7.2	58.3	+6.3	68.7	+7.4	70.2	+1.2	73.4	+0.2	72.4	+2.2	62.9	-2.8	50.8	-1.8	45.0	+2.5	34.5	+0.7	52.5	+1.5
Angola	26.0	28.9			30.7	-2.1	54.9	+6.3	69.0		70.5		75.0		73.5		61.3		47.7		40.5		31.3		49.1	
Auburn	32.8		34.5										72.9		71.6		60.0		46.4		42.3		30.8			
Bedford			35.8		38.9		61.5		70.2		72.5		77.0		74.8		65.2		51.4		45.7		37.0		55.2	
Bloomington																	64.6		51.9							
Bluffton	26.4		29.8		32.8		56.9		68.3		70.5		73.7		72.4		62.2		47.4		42.2		32.2		51.2	
Bright																	67.8		52.6		47.5		36.1			
Butler	32.2	+3.1	33.8	+0.3	37.1	-3.1	61.5	+6.4	69.9	+6.3	72.2	-0.9	75.7	0	74.5	+0.7	65.0	-2.0	51.9	-0.7	46.9	+4.9	36.6	+1.6	54.8	+1.4
Butlerville	28.5	+3.5	31.1	+3.1	33.9	-5.0	57.5	+5.0	67.4	-6.2	69.2	-0.8	73.0	-0.7	70.6	-0.7	60.8	-3.7	49.0	-1.9	43.6	+3.8	33.9	+0.9	51.3	+0.8
Cambridge City	27.5	+2.3	27.6	+1.0	31.6	-2.9	55.4	+5.5	68.0	+8.0	69.3	-1.4	72.0	-1.4	70.6	-0.1	60.8	-2.6	47.1	-2.1	40.4	+2.6	31.5	+1.1	50.0	+0.8
Columbia City																										
Columbus	30.1	+4.2	32.8	+1.8	36.3	-2.4	59.4	+5.4	68.9	+6.2	71.2	-1.6	74.8	-0.6	73.2	+0.5	63.0	-3.2	50.8	-1.7	45.3	+5.1	36.1	+1.9	53.2	+1.3
Connersville	29.7	+2.7	31.6	+1.2	33.5	-4.3	58.4	+6.9	68.6	+6.9	70.4	-1.2	73.7	+0.5	71.5	-0.6	61.8	-3.1	49.4	-2.2	43.8	+3.1	34.1	+1.1	52.2	+1.8
Delphi	26.7	+2.4	28.8	+0.6	33.1	-2.8	54.4	+4.0	64.8	+4.6	67.3	-4.5	74.6	+0.6	73.8	+3.1	63.5	-0.5	49.8	+0.1	42.6	+3.9	32.7	+0.8	51.0	+1.0
Edwardsville	34.6		35.8		38.4		64.4		72.7		74.5		78.3		77.6		68.8		55.9		48.8		40.3		67.5	
Evansville	33.8		36.4		40.4		64.2		71.6		74.7		79.0		77.6		68.0		54.6		47.1		39.1		57.2	
Farmland	29.5	+4.0	30.6	+1.0	33.8	-2.8	58.6	+7.6	68.0	+6.5	68.7	-2.7	73.0	-0.1	70.8	+0.1			48.9	-2.5	43.7	+3.9	34.7	+1.9	52.1	+1.6
Franklin	30.6	+4.6	32.5	+2.3	35.4	-2.9	59.5	+6.3	69.8	+3.8							63.5	-1.7	51.4	-1.0	44.3	+3.7	36.1	+0.8		
Greencastle	28.8		31.2		33.8		58.5		69.0		70.8		73.9		72.8		62.9		51.3		43.0		35.2		52.6	
Greensburg																										
Hammond	23.3		26.8		33.3		55.1		66.7		70.2		73.5		73.2		60.0		45.8		38.2		32.6		49.9	
Huntington	26.4	-0.1	28.3	+4.0	31.7	-5.7	56.8	+2.9	68.0	+4.7	69.4	-2.1	73.4	+1.8	72.3	-0.1	91.2	-4.2	47.8	-0.4	40.4	+1.5	32.5	+0.3	50.7	+0.2
INDIANAPOLIS	30.0	+2.4	32.3	0	36.0	-3.9	60.0	+7.5	70.8	+6.7	72.3	-0.2	75.9	-0.3	74.9	+1.1	64.2	-1.6	52.2	-2.4	44.6	+4.5	36.1	+2.8	54.1	+1.4
Jasper	34.8		36.8		40.2		63.2		70.9		72.6		77.8		77.8		67.6		53.3		47.4		38.7		56.8	
Jeffersonville	36.1	+2.5	27.3	0	39.7	-3.2	63.7	+5.8	71.8	+6.2	73.4	-2.2	77.9	+1.2	77.0	+1.9	67.1	-2.2	54.2	-0.8	49.5	+3.6	39.5	+1.1	57.3	+1.2
Knightstown									69.6		71.2		74.5		73.0		63.2		50.0		44.1		34.6			

BOARD OF AGRICULTURE.

MONTHLY MAXIMUM TEMPERATURE FOR THE YEAR 1896, WITH DATES.

STATIONS.	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.	
	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.	Maximum.	Date.
Anderson	56	23, 30	66	27	65	31	85	16	90	9, 10	91	6	92	27	93	6, 8	89	10, 11	77	28	71	17	59	12
Angola	50	30	60	27	65	31	90	28	90	10, 11	100	25	100	3, 31	101	10	92	11	78	28	76	28	60	12
Auburn																								
Bedford	56	23, 31	67	27																				
Bloomington			68	27	70	29	85	16, 17	93	10	92	21	98	30	96	6	92	10, 11	80	28	72	17	62	12
Bluffton	55	30	66	27	69	31	89	28	90	8, 10	96	5	94	27, 31	98	8, 9	92	12	79	29	73	17	59	12
Bright																								
Butler	58	30	68	27	75	29	90	18	94	10	95	6	98	29	97	6	91	12	75	29	70	2	61	12
Butler																								
Cambridge City	53	30	64	27	68	30	85	18	90	10	89	6	92	29	92	6	88	11, 12	77	28	72	2, 17	61	12
Columbia City	48	30	60	27	64	31	84	16, 17	89	10	93	5, 6	93	14	93	8, 10	87	11	74	29, 29	68	17	54	12
Columbus	56	23	68	27	70	20	87	16, 20	94	10	94	5	94	29, 30	95	6	92	12	75	29	74	16	63	10
Connersville	53	30	67	27	65	29, 30	86	16, 28	92	10	90	5, 7	92	30	91	6, 10	90	12	75	29	69	2, 26	60	12
Delphi	51	30	62	27	63	31	84	17	87	9, 13	91	25	94	13, 30	97	6	91	12	81	29	72	3, 17	63	13
Edwardsville	60	31	68	27	68	28, 30	88	18	90	10	90	20	94	30	94	7	91	11	80	29	75	17	65	10
Evansville	60	30	70	26	70	30	90	29	94	9	93	20, 21	100	30	101	6, 7	97	11, 14	84	28	78	17	68	12
Farmland	54	20	64	27	63	29, 30	85	16, 18	89	10	88	6, 7	91	27	92	6, 9	89	12, 14	74	28, 29	69	2	59	12
Franklin	55	20	68	27	69	29	88	17	91	10	88	7	91	29	92	6	87	11, 14	80	28	72	16, 17	61	12
Greencastle	53	30	65	27	65	30	84	16, 17	88	10	88	7	91	29	92	6	87	11, 14	76	28	70	17	59	31
Greensburg																								
Hammond	51	30	48	27	67	31	88	28	94	9	91	19	96	29	102	8	87	8	72	9, 29	71	2	54	10, 31
Huntington	53	30	65	27	65	29, 30	87	16	91	10, 11	93	7	94	13, 27	98	6	90	10	78	28, 29	70	2, 17	58	13
INDIANAPOLIS	54	30	70	27	68	30	87	16	92	9	84	6	96	29	98	6	82	12	78	28	71	17	61	12
Jasper	57	23, 30	70	27	73	29	88	16	93	10	91	6, 21	99	29, 30	100	6, 7	97	11, 12	81	28	74	17	63	12
Jeffersonville	58	23, 30	68	27	69	28, 30	90	17	91	10, 25	92	7	97	28, 30	96	6, 7	94	11	79	28	72	16, 26	63	12
Knightstown																								
Kokomo	53	30	64	27	66	31	89	16	93	10	97	6	96	1	98	6	93	12	78	28	70	17	59	12
Laconia	58	30, 31									94	6, 19	98	29	97	6	95	12	77	28			64	7
Lafayette	56	30	65	27	66	30	86	16, 17	92	8	93	6	95	14	95	6	95	12	79	18	72	17	61	12
Logansport	56	31	59	27	66	31	87	15	89	9	89	6, 7	92	27, 29	94	6	87	1, 2	76	29	72	17	58	10, 11
Madison	57	29	69	27	72	29	89	16, 18	93	10	91	23	96	29	96	6	93	11, 12	79	28	74	2	63	12, 13

Marengo	56	30, 31	63	27	73	29	90	16, 18	94	10	93	20	96	30	93	6	97	19	82	28	74	17	64	12
Marion	52	30	63	27	66	31	87	16	90	10	94	6	96	30	92	6	89	12	76	28	70	2	58	7
Mauzy	52	30	64	27	66	31	87	16	91	10	92	6	92	27, 30	92	6, 9	89	12	76	29	70	2	58	12
Mt. Vernon	56	19, 31	69	28	77	31	90	18	95	8	93	20, 21	100	30	102	7	100	12, 13	86	29	78	18	67	12
Northfield					63	29, 31	85	16	92	10, 11	92	6	94	27	94	6	90	12	75	28	70	7	57	12
Princeton	58	30	70	27	72	31	88	23, 28	94	10	95	19	99	30	100	6, 7	95	11, 12	82	28	76	17	63	12, 31
Richmond																9, 10						2	58	13
Rockville	55	30	69	27	69	30	88	16	93	9	91	5, 7	95	29	97	6	92	12, 14	79	28	75	17	60	12, 31
Scottsburg	55	23	69	27	71	29	88	17, 18	91	9, 10	92	20	97	29	98	8	95	12			73	17	63	13
Seymour	56	30	70	27	68	30	87	15, 17	92	9, 10	94	6	98	30	98	8	94	10	75	29	72	17	62	12
South Bend	52	30	60	27	66	31	86	16	90	8, 9	89	6	93	13	96	8	88	10, 12	70	28	71	17	61	12
Sunman	52	30	62	27	68	29	84	17, 28	91	10	88	20, 21	92	29, 30	92	6, 10	90	11	74	29	68	2	57	12
Syracuse	56	30	62	27	62	29, 31	84	17	85	9, 10			92	1, 3	95	9	84	12	76	29	76	17	52	30
Terre Haute	58	29	70	27	70	30	88	16	95	10	91	7	98	29	100	6	94	13	79	15, 28	75	17	61	10, 31
Tipton	55	31	72	1	72	30							96	27, 20	100	6	96	12	79	28	72	26, 17	58	12
Topeka																						17	56	12
Valparaiso	50	29, 30	59	27	67	31	87	16, 17	90	9, 10	90	7, 26	94	12, 13	96	8	88	10	79	28	74	19	60	13
Vevay	53	29, 30	70	27	75	29	91	17	94	9, 10	95	7	97	29	98	8	95	10, 12	78	27, 28	76	1, 17	65	7
Vincennes	57	31	71	28	72	30, 31	93	29	96	10, 11	98	21	100	27, 29	104	7, 8	97	13	78	29	74	18	63	13
Warsaw																8	87	10	80	28	71	3	62	15
Washington											91	21, 22	98	30	98	9	95	13	75	27	79	18	64	31
Worthington	55	30	71	37	68	30	89	16	90	9, 10	91	21	94	29	96	7	90	12, 13	82	28	71	1, 17	61	13

*On other dates also.

MONTHLY MINIMUM TEMPERATURES FOR THE YEAR 1896, WITH DATES.

STATIONS.	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.	
	Minimum	Date.	Minimum	Date.	Minimum.	Date.	Minimum	Date.	Minimum	Date.	Minimum.	Date.	Minimum	Date.	Minimum	Date.	Minimum	Date.	Minimum	Date.	Minimum	Date.	Minimum	Date.
Anderson	-10	4	-9	20	10	13	25	3, 7	47	3	48	11	47	17	46	27	31	23	24	19	10	30	10	1
Angola	-10	4	-5	17, 20	0	12	21	2	45	29	51	1	55	17	47	19	28	24	19	12	30	6	24	
Auburn	0	5	0	22									49	17	45	19	28	23	25	11	30	-	21	
Bedford			-2	21	14	12, 13	26	4	48	3	53	10	54	17	50	26	34	23	18					
Bloomington																	35	23	21	11	30	13	24	
Bluffton	-12	4	-8	20	2	12, 13	19	4	45	3	44	2, 10	46	17	42	19	28	23	25	11	20	7	24	
Bright																	36	19	18, 19	12	30	13	1	
Butler	-2	4	-8	21	10	13	23	4	46	3, 4	47	11	49	8	45	27	31	23	19	10	30	11	1	
Butlerville	-8	4	-8	20, 21	6	13	24	7	45	8, 15	46	11	49	17, 18	45	27	31	23	19	9	30	9	1	
Camb'ge City.	-12	4	-6	20	5	12, 13	22	2	50	29	46	2	52	17	50	19	32	23	25	10	30	5	24	
Columbia C'y.																								
Columbus	-5	3	-6	20	10	13	24	4	46	3, 15	45	11	50	17, 18	47	27	32	24	24	9	30	8	1	
Connersville	-6	4	-7	20	5	13	25	2, 7	47	3	48	2, 11	50	17	46	27	31	23	19	9	30	9	1, 2	
Delphi	-11	4	-8	20	8	13	22	3, 4	44	4	44	2, 11	48	17	46	28	33	23	19, 25	6	30	6	1	
Edwardsville.	-2	4	-1	20, 21	14	13	29	3	43	3	57	14	60	17	55	27	42	23	24	11	30	12	1	
Evansville	5	3, 4	2	20, 21	15	12	29	4	50	2	55	10	55	17	52	28	35	23	24	11	28, 29	14	24, 25	
Farmland	-6	3	-4	19	2	12	25	2, 6	48	2, 31	47	10	49	16	47	18, 31			18	11	27, 30	11	23	
Franklin	-4	4	-4	20	14	12, 13	29	3	58	3, 28							40	23	25	10	30	10	1	
Greencastle	-4	4, 5	-5	20, 21	12	12	25	3	53	5	52	13	54	17	51	19, 28	37	23	19	9	30	9	1	
Greensburg																								
Hammond	-9	4	-12	20	4	12	27	6	44	20	40	10	42	16	44	19	32	19	21	6	28, 29	5	1	
Huntington	-10	4	-6	19	4	12	24	2	49	28, 29	42	1	50	16	47	18, 31	32	22	24	10	29, 30	10	23	
INDIANAPOLIS.	-5	4	-5	20	12	12, 13	26	3	52	29	52	2	54	17	50	19	37	23	19	10	30	12	1	
Jasper	4	4	-5	21	10	17	27	4	49	3	53	10, 14	53	18	48	27	35	24	22, 25	13	30	13	1, 25	
Jeffersonville.	3	4	4	20, 21	16	14, 17	30	3, 4	52	3	54	12	52	18	51	28	38	23, 24	25	15	30	15	1	
Knightstown									46	3	48	11	50	17	46	27	32	23	19	9	30	9	1	
Kokomo	-8	4	-6	20	9	13	21	2	50	29	48	2, 11	50	17	47	19, 28	32	23	23	9	30	10	1	
Laconia	4	4									54	12	55	18	52	28			18			11	1, 25	
Lafayette	-12	4	-8	20, 21	8	13	20	4	45	3	46	11	49	17	46	28	30	23	19, 24	5	30	17	1	
Legansport.	-7	4	-8	20	5	13, 14	25	3, 4	50	28	49	1	50	6	46	16	34	22	24	9	29	11	24	
Madison	1	4	-2	20, 21	13	13	27	4	52	4, 15	52	11	55	17, 18	51	27	38	23	25	15	30	14	1	

Marengo	3	4	4	8	21	4	17	25	4	49	15	50	29	52	18	47	27, 29	32	24	29	25	15	30	13	1, 25
Marion	-12	4	4	-6	20	4	12	30	3	49	29	47	11	50	17	47	27, 29	30	23	24	19	9	30	10	1
Maury	-8	4	5	-8	20	5	13	23	4	46	3	46	2	50	18	46	27	30	23	25	8	8	30	7	1
Mt. Vernon	6	4	18	6	20	18	13	30	3, 4	51	3	52	15	56	16	52	31	38	23	30	25	11	29	15	1
Northfield	.	.	9	.	.	9	13	22	4	47	3	47	11, 12	49	17	46	27, 28	32	23	28	19, 25	7	30	8	1
Princeton	2	4	14	2	21	14	13	27	4	48	15	54	10	56	18	50	27	37	24	29	25	12	30	14	1
Richmond	.	.	.	.	.	.	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	30	10	1
Rockville	-5	4	8	-5	20	8	13	23	4	47	3	50	11	50	17	46	27	32	23	23	19	6	30	7	1
Scottsburg	1	4	13	0	20, 21	13	17	27	4	54	3, 5	53	11	54	18	51	27, 29	34	21	.	.	13	30	14	1, 25
Seymour	0	4	12	0	20	12	13	25	3	52	2, 29	52	2	54	17	50	19	37	23	30	19	14	29, 30	14	1
South Bend	-10	4	-3	7	21	-3	12	13	2	45	21, 31	42	2	46	17	44	19	30	23	25	19	9	30	4	2
Sunman	-6	4	8	-6	20, 21	8	13	24	3, 4	58	3	48	2, 11	50	17, 18	48	27	32	23	28	19	8	30	13	25
Syracuse	-10	4	1	-2	20, 21	1	12	24	2	55	28	52	.	62	9	52	19, 28	34	23	25	19, 24	10	30	-8	24
Terre Haute	0	4	16	-1	20	16	12, 13	28	3	52	3	55	10	56	17	53	28, 29	40	23	30	25	12	30	14	2
Tipton	-14	4	3	-9	20	3	13, 14	.	.	.	.	.	.	49	17	47	19	31	23	23	25	6	30	6	1
Topeka	.	.	.	.	.	.	12	19	.	.	.	.	.	60	4, 18	47	18	34	.	28	24	10	30	10	24
Valparaiso	-12	4	3	-11	20	3	12	36	2	46	22, 31	47	10	59	4, 16	47	18	36	22	26	24	9	29	8	1
Vevay	0	4	12	0	20	12	13	36	2	50	3	55	2, 13	59	16	53	27	36	23	30	25, 26	14	30	14	26
Vincennes	2	4	11	0	31	11	13	27	3, 4	.	.	50	10	50	7	45	27, 28	31	23	29	23	11	30	12	1
Warsaw	.	.	.	.	.	.	.	.	.	.	.	.	2, 10	56	18	42	19	32	20	22	25	10	30	8	24
Washington	.	.	.	.	.	.	.	.	.	.	.	54	14	50	18	52	19, 27	38	23, 24	30	19	12	20	13	1
Worthington	0	4	12	-2	20	12	13	25	4	51	15	54	14	50	18	50	27, 30	36	23, 24	24	25	11	30	11	1

**MONTHLY AND ANNUAL PRECIPITATION FOR THE YEAR 1896,
WITH DEPARTURES FROM THE NORMAL.**

STATIONS.	January.		February.		March.		April.		May.		June.		July.	
	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.
Anderson	1.14		1.80		2.74		2.33		3.86		3.74		9.16	
Angola	2.37	+0.10	2.01	-0.66	3.12	+0.56	5.91	+2.78	4.35	-0.06	3.58	-0.30	12.78	+9.22
Auburn			0.72										8.87	
Bedford	1.10										3.80			
Bloomington			2.60		2.10		T.		5.12		3.52		7.78	
Bluffton	1.31		1.52		3.43		5.29		5.63		4.66		6.55	
Bright														
Butlerville	1.00	-2.72	2.68	-1.32	4.37	+0.77	0.43	-3.15	2.75	-1.67	3.02	+0.47	8.75	+5.37
Cambridge City	1.84	-0.71	1.84	-1.11	3.13	+0.70	1.18	-2.86	2.85	-1.45	3.49	-1.06	6.00	+3.30
Columbia City	1.60	-0.69	1.88	-0.71	2.41	+0.04	2.41	-0.69	4.33	-0.28	2.15	-1.29	12.20	+8.90
Columbus	1.17	-1.97	2.00	-1.44	4.63	-0.10	0.21	-2.81	1.97	-1.23	3.51	-0.04	8.33	+5.59
Connersville	1.38	-1.66	1.60	-2.22	3.09	+0.33	1.27	-2.00	3.35	-0.95	4.05	-0.47	7.31	+4.59
Delphi	0.79	-1.88	1.72	-0.80	1.98	-0.47	2.62	-0.93	4.57	-0.70	2.99	-0.74	7.61	+4.19
Edwardsville	1.21		2.77		4.73		0.45		4.59		5.64		7.72	
Evansville	0.57		1.71		3.51		1.65		5.39		6.62		5.53	
Farmland	1.26	-1.30	1.90	-1.38	2.89	+0.45	2.20	-1.10	4.49	-0.89	4.54	-0.18	11.83	+8.34
Franklin	1.70	-1.26	2.83	-0.31	3.04	+0.31	0.97	-2.00	2.23	-2.07				
Greencastle	0.86		2.21		2.50		1.06		5.19		5.74		6.68	
Greensburg									3.75		2.94		5.00	
Hammond	2.68		3.40		3.69		3.92		3.95		2.82		6.48	
Huntington	1.73	-0.53	1.75	-0.28	3.02	+0.86	2.82	+0.53	6.56	+2.62	3.95	+1.75	11.08	+5.70
INDIANAPOLIS	1.60	-1.28	2.47	-1.00	3.08	-0.88	1.27	-2.32	3.56	-0.59	3.09	-1.70	5.72	+1.39
Jasper	0.70		2.00		5.15		0.53		6.52		4.81		4.00	
Jeffersonville	0.90	-2.39	2.89	-1.10	4.63	+0.14	0.24	-3.84	4.37	+0.68	4.88	+0.71	10.75	+6.07
Knightstown							1.66		4.56		4.58		5.75	
Kokomo	0.99	-0.92	1.85	-0.86	2.17	-0.07	4.12	-0.31	4.90	+0.62	2.08	+0.34	9.17	+5.75
Laconia	1.65										4.05		6.80	
Lafayette	0.83	-1.35	1.64	-1.38	1.55	-1.05	2.55	-0.97	4.71	+0.70	4.13	-0.29	10.73	+7.05
Logansport	1.02	-1.21	0.73	-1.88	1.78	-0.79	2.80	-0.63	4.23	+0.53	3.74	+0.07	7.04	+4.07
Madison	1.44	-2.61	2.33	-0.15	4.26	+0.89	0.28	-3.21	5.63	-0.47	6.81	+2.68	7.65	+3.78
Marengo	2.30	-2.93	4.45	-2.74	4.92	-0.11	0.30	-6.09	5.89	+0.30	5.31	-0.25	4.64	-0.26
Marion	1.59	-0.39	1.91	-0.93	2.83	+0.65	3.11	-0.05	3.64	-0.06	3.77	+0.54	6.19	+4.15
Mauzy	0.49	-1.78	2.39	-1.76	3.15	-0.29	1.02	-2.24	3.52	-1.05	4.26	-0.52	7.69	+5.03
Mt. Vernon	1.06	-2.36	1.52	-1.51	3.46	-0.76	2.59	-1.26	6.24	+2.11	3.73	-0.37	2.88	-0.75
Northfield					2.38		1.73		3.50		4.04		8.05	
Princeton	1.19	-2.01	2.60	-0.72	5.85	+2.45	2.35	-1.00	8.55	+4.77	5.20	+1.32	4.00	+0.96
Richmond													6.12	
Rockville	0.85	-1.64	1.72	-1.40	1.71	-1.11	1.58	-2.17	4.65	+0.87	5.59	+1.90	8.35	+5.41
Scottsburg	0.81		2.00		3.45		0.10		6.51		7.59		4.66	
Seymour	0.92	-2.65	3.33	-0.35	3.26	-0.18	1.25	-3.25	3.59	-0.08	5.78	+1.32	4.61	+1.22
South Bend	1.04		1.77		2.28		2.35		3.01		3.81		7.45	
Sunman	1.30		2.28		3.87		0.55		3.37		6.02		7.57	
Syracuse	1.35		1.55		2.55		2.51		3.43		2.04		8.83	
Terre Haute	0.75	-0.92	2.15	+0.37	2.20	-0.32	1.41	-2.65	3.56	+0.56	5.19	+1.49	7.29	+3.29
Tipton	0.93		1.80		2.46						3.53		11.99	
Topeka														
Valparaiso	1.15	-0.44	2.75	+0.77	2.45	+0.67	3.34	+0.30	6.42	+1.44	4.34	+1.96	7.57	+3.79
Vevay	1.45	-1.38	2.30	-1.38	4.50	+0.47	0.22	-3.31	6.27	+2.74	4.60	-0.33	7.50	+2.92
Vincennes	0.55		2.84		3.81		0.59		4.84		5.65		5.44	
Warsaw														
Washington											6.38		3.33	
Worthington	1.05	-1.81	2.64	-1.33	2.45	-0.38	0.61	-3.09	4.09	+0.31	6.00	+1.54	7.43	+3.76
Southern Portion	1.12	-2.57	2.42	-1.61	4.03	+0.54	0.71	-3.20	4.96	+0.92	5.22	+1.01	9.13	+2.69
Central Portion	1.24	-1.75	2.11	-1.02	2.84	-0.02	1.36	-2.08	3.86	-0.18	4.26	+0.36	7.87	+4.78
Northern Portion	1.41	-1.96	1.88	-0.75	2.58	+0.14	3.37	+0.27	4.67	+0.11	3.39	-0.34	8.84	+5.67
STATE	1.26	-1.68	2.14	-1.34	3.14	+0.05	1.81	-1.69	4.50	+0.27	4.29	+0.26	7.61	+4.27

MONTHLY AND ANNUAL PRECIPITATION—Continued.

STATIONS.	August.		Sept'ber.		October.		November		December.		Annual.	
	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.	Precipitation.	Departure.
Anderson	5.30		7.71		1.09		3.00		0.90		42.77	
Angola	7.60	+4.50	5.90	+1.90	0.75	-1.48	2.12	-1.50	1.53	-0.91	52.02	+14.15
Anburn	3.54		4.65		0.47		1.75		1.06			
Bedford			4.45		T.							
Bloomington	7.49		4.16		1.35		4.36		0.90			
Bluffton	7.85		5.04		1.04		2.31		1.82		46.45	
Bright			4.75		1.21		3.67		1.75			
Butlerville	3.21	-0.56	4.81	+2.62	1.72	-0.27	3.62	-0.64	1.35	-1.25	39.71	-2.95
Cambridge City	8.14	+5.60	5.96	+1.60	0.69	-0.96	3.90	+0.21	1.79	-0.80	40.70	+2.46
Columbia City	4.12	+1.63	4.65	+1.19	0.50	-1.36	2.50	-1.00	1.09	-1.28	39.84	+4.46
Columbus	3.50	-0.37	4.57	+1.26	1.00	-0.95	3.47	-0.16	1.05	-1.64	35.91	-3.88
Connersville	4.61	+1.81	4.99	+2.14	1.05	-1.12	4.90	+1.01	1.63	+1.22	39.22	+0.24
Delphi	6.61	+3.59	4.82	+2.17	0.69	-0.81	2.52	-1.09	0.79	-1.41	37.71	+1.12
Edwardsville	3.97		2.13		1.78		4.56		1.99		41.45	
Evansville	2.98		5.22		2.71		3.10		0.90		37.89	
Farmland	8.62	+4.55	6.19	+2.61	0.55	-0.88	2.30	-0.22	1.66	+0.88	48.64	+9.22
Franklin			4.24	+1.42	1.40	-1.24	3.79	-0.07	1.13	-1.78		
Greencastle	4.86		5.30		1.34		5.04		1.14		41.92	
Greensburg			6.36				4.13		1.68			
Hammond	5.78		5.04		1.11		3.27		0.42		42.56	
Huntington	8.96	+5.09	4.97	+1.85	1.19	+0.14	3.05	+0.78	1.65	+1.81	50.73	+15.14
INDIANAPOLIS	3.91	+0.55	8.17	+5.00	1.65	-1.18	4.19	+0.41	1.13	-1.88	39.84	-3.38
Jasper	1.47		6.50		1.55		2.85		1.00		36.50	
Jeffersonville	6.12	+2.69	4.19	+1.82	1.94	-0.05	5.35	+1.13	2.21	-1.21	48.47	+4.75
Knightstown	5.87		5.46		0.95		4.12		1.40			
Kokomo	5.55	+3.33	3.83	+0.17	0.87	-0.26	2.96	-0.59	1.32	-0.99	39.81	+6.21
Laconia	0.95				1.65				1.10			
Lafayette	4.03	+0.83	5.13	+2.21	0.37	-1.77	2.10	-1.12	0.78	-1.76	38.45	+1.10
Logansport	4.05	+1.67	5.15	+2.27	0.60	-1.34	1.19	-2.63	0.58	-1.86	32.91	-1.75
Madison	3.33	+3.56	5.66	+2.37	1.54	-0.76	4.27	+0.44	1.42	-1.75	44.62	+5.77
Marengo			3.68	-1.12	2.06	-1.02	3.76	-2.13	1.36			
Marion	8.86	+5.81	4.85	+2.27	1.25	-0.28	2.83	-0.53	1.54	-0.48	42.37	+10.79
Mauzy	4.68	+1.94	4.94	+1.99	1.00	-1.41	4.20	+0.14	1.43	-1.67	39.77	-1.63
Mt. Vernon	1.49	-2.04	2.97	+0.84	2.53	+0.39	2.85	-1.66	0.77	+2.15	32.09	-9.52
Northfield	4.33		5.12		1.39		3.28		1.26			
Princeton	4.11	+1.39	3.61	+0.46	2.00	-0.05	3.90	-0.14	0.50	-2.92	43.86	+4.51
Richmond	10.88		5.93		0.99		3.43		1.88			
Rockville	3.99	+1.26	5.10	+2.23	1.07	-0.79	3.58	-0.57	0.77	-1.78	38.69	+2.11
Scottsburg	3.21		4.83		1.25		3.04		1.07		39.57	
Seymour	4.55	-1.25	5.10	+2.26	1.57	-0.78	3.78	-0.67	1.63	-1.11	38.37	-2.02
South Bend	4.79		4.93		0.98		2.69		0.37		35.47	
Sunman	3.07		6.15		1.47		3.83		1.99		41.37	
Syracuse	5.19		4.54		0.89		1.86		0.76		35.50	
Terre Haute	4.01	+0.74	4.73	+0.55	0.87	-0.26	4.08	+0.87	1.13	-1.33	37.37	+2.36
Tipton	5.85		4.09		0.22		4.18		1.63			
Topeka					0.59		2.49		0.85			
Valparaiso	6.40	+3.60	4.95	+0.37	1.17	-0.43	3.34	+0.77	0.44	-2.36	44.31	+10.45
Vevay	4.20	+0.74	4.35	+1.06	1.37	-0.57	4.05	+0.47	1.25	-1.44	42.06	-0.01
Vincennes	2.60		4.53		1.58		4.56		0.38		37.37	
Warsaw	8.26		4.32		0.13		2.84		1.86			
Washington	2.71		4.94		1.94		2.18		0.64			
Worthington	4.84	+1.07	3.94	+0.66	1.59	-0.84	5.44	+1.03	0.87	-2.08	40.95	-1.16
Southern Portion	3.62	-0.03	4.69	+1.29	1.65	-0.40	3.18	-0.99	1.25	-1.84	38.98	+1.90
Central Portion	5.89	+2.67	5.47	+2.05	1.01	-0.87	3.89	-0.05	1.33	-1.44	41.13	-2.75
Northern Portion	6.11	+3.26	4.89	+1.58	0.78	-1.06	2.64	-0.72	1.10	-1.46	41.64	+4.74
STATE	5.21	+2.13	5.02	+1.82	1.15	-1.14	3.24	-0.52	1.29	-1.51	40.66	+0.92

INSURANCE ON THE FARM.

The question of "What kind of insurance is best for the farmer?" has revolved in as many minds as there are enterprising farmers in Indiana, and the fact that farm insurance is treated in such various ways must of necessity leave the answer doubtful, as it affects very many deeply interested. That all farm buildings should be properly insured is no longer a question, but, to the contrary, when a farm building burns without insurance the derelict farmer is an object of pity and not of sympathy.

To bring this matter to those interested I have sought information from many sources, and have thus been enabled to make deductions which, it is hoped, will prove valuable rather than entertaining.

In many of the counties in Indiana companies are organized on the mutual or co-operative plan, and though they have greatly different methods and means, yet there remains a sufficient likeness to entitle them to become a part of a general organization where differences may be reduced and more perfect methods devised. Mutual insurance can be made so perfect in its working that it will become popular and receive almost universal patronage, but in making this article apply to the business in a general and not a specific way some criticisms can not be applicable to every case.

The greatest need of almost all of these companies is to effect a proper rating of buildings. It is so manifestly unjust to ask the man who has given himself all the protection possible in the construction of his buildings; who has built of brick with metal or slate roof; who has avoided unnecessary exposure; who has not attempted to stable all of his stock and garner all of his grain under one roof, to pay the same rate on each \$100 at each needed assessment as the more cheaply constructed building with the always dangerous tile flues, the stovepipe projecting through the side wall, or all buildings within a cramped enclosure. There is so little excuse for this lack of proper rating that it would seem that it would force its own correction.

In some instances there should be more promptness in settlement of claims, and in order that this could be accomplished a small reserve should always be available. Some companies try to be too conservative and limit their territory too closely, while others undertake to enlarge their field of operation beyond the point where a proper oversight of the risk assumed can be maintained. A safe and perfectly proper rule would seem to be to let the territory be limited to the county, and it is doubtful if a less field is desirable. Seek to have laws enacted that will direct as well as protect, and to this end the State organization of co-operative insurance should receive the support of every farmer, whether insured or in need of insurance.

The correspondence that has been conducted has established the fact that the cost of mutual insurance in twenty-six counties reported was for the last fiscal year twenty-three and one-half cents on the one hundred dollars; that for the last five years the annual cost on one hundred dollars was twenty-two and two-fifths cents. In Huntington County the report stated that for the last twenty-two years the average cost of insurance is fifteen cents on the one hundred dollars, while in Clinton County for the twenty-eight years the company has been doing business the average cost was seventeen cents per one hundred dollars. The maximum rate paid by any company in the State as reported was sixty-five cents on the one hundred dollars, while the minimum rate reported was five cents on the one hundred dollars. The same correspondence established the fact that the rate charged by foreign companies for the frame, shingle roof buildings of the farmer was fifty cents on the one hundred dollars for annual insurance, and one dollar and fifty cents, payable in advance, for the five-year-term insurance. When we consider that some of the mutual companies are more hazardous than the foreign companies, and that risks that would be refused by the foreign companies are carried by these, the estimate in favor of the mutual companies as shown by the above figures must be augmented. A resort to the courts in the collection of a loss from a farmers' mutual company is a very rare proceeding, and speedy settlements is the prevailing rule. There can be but one conclusion in this matter, and that is that farmers owe it to themselves to join hands with their brothers and in protecting them, protect themselves; and since they have been the pioneers in civilization, let them demonstrate that mutual insurance is practical, free from a dictatorial rate combine, and thus cheaper for the insured. Experience is the most perfect teacher man receives instruction from. These estimates have given place to actual experiences, and the deductions here given are without color with the hope of supplying new and needed information.

REPORT
OF THE
State Live Stock Sanitary Commission
OF THE
STATE OF INDIANA,

With the Statutes of 1889 for the Suppression of Contagious Diseases Among
Domestic Animals, and Other Information Connected
with the Work of the Commission.

RULES ADOPTED JUNE 11, 1889.

COMMISSION.

GEO. W. HALL, Rush Co.	V. K. OFFICER, Jefferson Co.	M. S. CLAYPOOL, Delaware Co.
F. A. BOLSER, Veterinarian, New Castle, Ind.		
MORTIMER LEVERING, Secretary, Lafayette, Ind.		

RULES OF THE STATE LIVE STOCK SANITARY COMMISSION.

1. Upon reliable information that any domestic animal is infected with any dangerously contagious or infectious disease, the case must at once be reported to the Secretary of the County Board of Health of the county in which the case exists, and said Secretary shall at once notify the Secretary of this Commission. A failure to comply with the above will render the party liable to be prosecuted under the laws of the State of Indiana provided in such cases.

2. When any horse, mule, ass, cattle or sheep is reported to be infected with any dangerously contagious or infectious disease, said Secretary or any member of the Live Stock Sanitary Commission shall at once notify the State Veterinarian of such report, who shall at once visit the premises where such animals are, and thoroughly examine the same, and if, upon examination, he is satisfied that the disease is a dangerously contagious or infectious disease he shall quarantine the

(Give diagnosis of disease fully and particularly.)

animal or animals and premises, and also quarantine all animals or premises that have been exposed to such disease, and promptly notify the Commission of his action, accompanying the same with all the correspondence relative to the case, and also notify the owner of his opinion.

3. All quarantines established by the State or an Assistant State Veterinarian shall continue in force until removed by order of the Commission. Parties whose animals are quarantined under the provisions of this law may have the same released from quarantine by making satisfactory proof to the Commission that the cause for which such quarantine was originally declared no longer exists.

4. The State Veterinarian or Secretaries of County Boards of Health making reports of investigation shall give the name and postoffice address of the owner of animals inspected, location of such animals, date of inspection, complete description of animals diseased and of animals exposed, a description of the exposure to which they have been subjected, the condition of the diseased animals, the name and address of the nearest constable, and the time employed in such investigation. The report must be accompanied by an exact duplicate of the quarantine notice served, with return made thereon of the manner of service, and all correspondence relative to the cause. Said report must be addressed to the Live Stock Sanitary Commissioners of the State of Indiana, and directed to the Secretary at Lafayette, Indiana. Proper blanks will be furnished upon application to the Secretary.

5. Whenever it shall come to the knowledge of the Secretary of the County Board of Health that animals have been brought into his locality from a State or county known or believed to be infected, against which the Governor of the State has proclaimed, he shall immediately notify the Secretary of this Commission of the facts, so far as he knows them, covering the following points, viz.: Locality from whence such animals came, name and postoffice of owner or person in charge, if shipped by railroad or boat, giving names of same, time of arrival, number, age, sex and breed of animals, so far as it is practicable to ascertain.

6. The Commission will not approve the claim for any animals destroyed unless they were so destroyed by the order of some member of the Commission, having first been appraised by them.

7. When it is deemed necessary, any member of the Commission may appoint any local veterinarian to do any service in examining, treating and caring for diseased animals, and no bill for services, examinations, or for materials and expenses, will be recognized unless first ordered by some one of the Commission.

8. Assistant State Veterinarians, when appointed by the Commission to do special work, shall be entitled to receive for their services three dollars per day and necessary expenses; but in no case shall they receive more than four dollars per day and necessary expenses while engaged in the public service; neither shall they be permitted to make any charge nor receive any compensation from a private individual during the time they are actually employed and paid by the State. Nor will any bill for services or expenses be approved unless so ordered by some member of the Commission.

9. Any person desiring to ship any animal or animals from this State to another State, the authorities of which require health certificates to accompany

such animal or animals, may call upon the State Veterinarian, or some one authorized by this Commission, and request him to inspect such animal or animals. It shall thereupon be the duty of such veterinarian to at once make such inspection, and, if he finds the animal or animals to be healthy and to come from a locality wherein there does not, nor has not for four months preceding, existed any case of contagious disease among the kind of animals in question, he shall give to the owner of such animal or animals a certificate of health, specifying the number, sex and breed of such animal or animals. For such services said Veterinarian shall be entitled to receive from the owner the same compensation as herein allowed him by the State, together with his necessary expenses in going from and to his regular place of business or abode. In no case shall the State be liable for the cost of such services; neither shall the Veterinarian receive from any private person for such service a compensation greater than herein authorized. Any violation of this provision shall be considered sufficient ground for dismissal from the service of the State. At the end of each month veterinarians making such inspections are required to make a tabulated report of the same to the Secretary of this Commission.

RULES FOR DISINFECTION.

The following rules for disinfection are recommended by Dr. F. A. Bolser, State Veterinarian:

1. Have all loose litter, hay and rubbish, removed and burned.
2. Have all manure removed to land where animals have no access.
3. Have all feed troughs, hay racks and all wood work thoroughly cleaned by washing with hot water, in which two ounces of carbolic acid to each gallon of water are dissolved.
4. Thoroughly whitewash the whole of the interior of the building with a whitewash containing one pound of chloride of lime to each four gallons of water. Enough freshly burned quick lime should be added to make the wash show where applied. Especially should this be applied to the sides and front of the stalls, feed troughs and hay racks (inside and out).
5. All rotten wood work to be removed and burned.
6. All buckets, forks, shovels, brooms and other objects used about the stable, to be washed and covered with the same solution.
7. All drains to be thoroughly cleaned and disinfected with the solution of chloride of lime, one pound to four gallons of water.
8. In cases of glanders, all harness, poles and shafts of wagons, neck-yokes and pole-straps, should be thoroughly washed with hot water and soap, and afterward oiled with carbolized oil, one part of carbolic acid to eight of oil. Before applying the oil, harness should be hung up in the open air for one week.

To Secretaries County Boards of Health:

The following decision is given by the State's Attorney-General in relation to the paying of services rendered by secretaries of county boards of health to the Indiana State Live Stock Sanitary Commission, to wit:

INDIANAPOLIS, April 18, 1890.

MORTIMER LEVERING,

Secretary State Live Stock Sanitary Commission:

SIR—You have addressed to me the following: "At a recent meeting of the Indiana State Live Stock Sanitary Commission a number of bills were filed by secretaries of county boards of health for various services performed, which they claim this commission should pay under section 7, Acts 1889, p. 381. I will give you a sample of the bills sent in, viz.:

"Are secretaries of boards of health, as State officers, expected to do all this work as the duty incumbent upon the office, and shall they be paid under the provisions of the statutes made in relation to secretaries of boards of health?"

Section seven of the act concerning your commission is as follows:

"It shall be the duty of said secretary of such county board of health to keep a record of all cases so reported to him, including the age, sex and distinguishing characteristics of such animals, and it shall be the duty of such secretary of said board of health to immediately examine, either in person or by a qualified person appointed by him for that purpose, all animals so reported to be diseased, and if they find that said animal or animals are affected with a contagious disease to immediately report the same to said commission, or some member thereof, and the said Secretary shall promptly take such measures as he shall deem most expedient to prevent the spread of the disease until said commission shall be able to relieve him from the charge and care of such animal or animals. All the necessary expenses necessarily incurred by said Secretary of such Board of Health and his agents, in carrying out the provisions of this act, shall be paid in the same manner as are those of the commission." You will observe that this section requires the Secretary of the County Board of Health to make the examination and report "either in person or by a qualified person appointed by him for that purpose." The statute does not permit him to appoint such a person to assist him, but only to appoint one to do the work when he can not do it himself. In other words, the Secretary is required to do the work himself, or appoint some one to do the work for him, but not with him. Hence it follows that there can be no charge for the services and expenses of Dr. "B." in the two cases you mention. The concluding sentence of section seven allows the Secretary of the County Board of Health the expenses necessarily incurred by him and his agents, to be paid by your commission. "Expenses" can not be held to embrace salary or per diem compensation, for it only means that which is expended, laid out or consumed. An expense account can not properly embrace items of salary or compensation. The act does not authorize your commission to pay salaries or compensation to secretaries of county boards of health, or their agents. The secretary of a county board of health is paid for his services by the board of commissioners of his

county. Sec. 4993, R. S. 1881. He can not receive compensation from any other source in the absence of the statute entitling him thereto. *Mechem on Public Officers*, sections 855, 856. The Legislature may attach additional duties to an office without increasing the compensation. *Turpin v. The Board*, 7 Ind. 172; *The Board v. Blake*, 21 Ind. 32; *The Board v. Gresham*, 101 Ind. 53, and cases there cited. *Mechem on Public Officers*, section 862.

It is clear that the act creating your commission has imposed additional duties upon the secretaries of county boards of health and has not empowered the commission to pay therefor. Therefore it follows that such secretaries and their agents are not entitled to compensation from your commission.

Respectfully submitted,

L. T. MICHENER,
Attorney-General.

REGULATIONS CONCERNING CATTLE TRANSPORTATION.

U. S. DEPARTMENT OF AGRICULTURE, }
OFFICE OF THE SECRETARY, }
WASHINGTON, D. C., February 5, 1891. }

To the Managers and Agents of Railroad and Transportation Companies of the United States, Stockmen and Others:

In accordance with section 7 of the act of Congress approved May 29, 1884, entitled "An act for the establishment of a Bureau of Animal Industry, to prevent the exportation of diseased cattle, and to provide means for the suppression and extirpation of pleuro-pneumonia and other contagious diseases among domestic animals," and of the act of Congress approved July 14, 1890, making appropriation for the Department of Agriculture for the fiscal year ending June 30, 1891, you are hereby notified that a contagious and infectious disease known as splenic or southern fever exists among cattle in the following described area of the United States:

All that country lying east and south of a line commencing at the southeast corner of the Territory of New Mexico, thence running northerly along the eastern boundary of New Mexico to the southwestern corner of the county of Cochran, State of Texas, thence easterly along the southern boundaries of the counties of Cochran, Hockley, Lubbock, Crosby, Dickens and King to the one hundredth meridian of longitude; thence northerly along said one hundredth meridian to the southern boundary of the State of Kansas; thence easterly along the southern boundary of the State of Kansas to the northeast corner of the Indian Territory; thence southerly along the eastern boundary of the Indian Territory to the southwestern corner of the State of Missouri; thence easterly along the southern boundaries of the State of Missouri and the State of Kentucky and the State of Virginia to a point wheresaid boundary is intersected by the Blue Ridge Mountains; thence in a northeasterly direction, followingsaid Blue Ridge Mountains to the southwestern

corner of the county of Madison, State of Virginia; thence easterly along the southern boundaries of the counties of Madison, Culpepper and Stafford, thence northerly along the eastern boundary of Stafford County to the Potomac River; thence following the Potomac River southerly to the Chesapeake Bay; thence easterly along the southern boundary of Maryland to the Atlantic Ocean.

From the fifteenth day of February to the first day of December no cattle are to be transported from said area to any portion of the United States north or west of the above described line, except in accordance with the following regulations:

First. When any cattle in course of transportation from said area are unloaded north or west of this line to be fed or watered, the places where said cattle are to be so fed or watered shall be set apart and no other cattle shall be admitted thereto.

Second. On unloading said cattle at their points of destination, pens shall be set apart to receive them, and no other cattle shall be admitted to said pens; and the regulations relating to the movement of Texas cattle, prescribed by the Cattle Sanitary Officers of the State where unloaded, shall be carefully observed. The cars that have carried said stock shall be cleansed and disinfected before they are again used to transport, store or shelter animals or merchandise.

Third. Whenever any cattle that have come from said area shall be reshipped to any of the points at which they have been unloaded to other points or destinations, the car carrying said animals shall bear a placard stating that said car contains southern cattle, and each of the way bills of said shipment shall have a note upon its face with a similar statement. At whatever point these cattle are unloaded they shall be placed in separate pens, to which no other cattle shall be admitted.

Fourth. The cars used to transport such animals, and the pens in which they are fed and watered, and the pens set apart for their reception at points of destination shall be disinfected in the following manner:

- (a.) Remove all litter and manure. This litter and manure may be disinfected by mixing it with lime, diluted sulphuric acid, or if not disinfected, it may be stored where no cattle can come in contact with it until after December 1.
- (b.) Wash the cars and the feeding and watering troughs with water until clean.
- (c.) Saturate the walls and floors of the cars and the fencing, troughs and chutes of the pens with a solution made by dissolving four ounces of chloride of lime to each gallon of water, or disinfect the cars with a jet of steam under a pressure of not less than fifty pounds to the square inch.

The losses resulting yearly to the owners of susceptible cattle, both in the interstate and export trade, by the contraction of this disease from exposure in unclean and infected cars and pens, and by means of the manure carried in unclean cars from place to place, and the threatened prohibition of our export trade by foreign governments because of the occurrence of this disease, have become a matter

of grave and serious concern to the cattle industry of the United States. It is absolutely essential, therefore, that this cattle industry should be protected as far as possible by separating the dangerous cattle and by the adoption of efficient methods of disinfection.

A rigid compliance with the above regulations will insure comparative safety to northern cattle and render it unnecessary to adopt a more stringent regulation, such as the absolute prohibition of the movement of southern cattle, except for slaughter, during the time of year that this disease is fatal. Inspectors will be instructed to see that disinfection is properly done, and it is hoped that transportation companies will promptly put in operation the above methods.

Very respectfully,

J. M. RUSK,
Secretary.

The County Commissioners of Every County:

GENTLEMEN—It is desirable to keep this State as free from contagious animal diseases as possible, and for this purpose address your honorable body, referring you to the Live Stock Sanitary Act of 1889.

The per cent. of dangerously contagious or infectious diseases is yet small; the proper vigilance and proper measures will keep it so. We are anxious to get tuberculosis (consumption) under such control as will lead ultimately to its extermination. It is now known that this dread disorder, which causes in man one death in five from all diseases, is directly communicable from the lower animals to the human species. This consideration alone makes it imperative that the strictest measures of inspection and prevention should be instituted by us, assisted by the various Boards of Commissioners throughout the State. We therefore urge upon you the necessity of appointing a competent veterinarian or physician, or both, in your county to inspect the dairies and stationary herds of your county with the view of detecting the presence of any such dangerous contagious or infectious disease, the result of such inspection to be reported in writing to your honorable body and a duplicate report to be made out at the same time and sent to the State Veterinarian.

The compensation for such service should be such as will secure adequate ability, and must be paid out of the funds under your control, as under the statutes our appropriation can not be so used.

Respectfully,

C. N. METCALF,
Secretary State Board of Health.

CHAPTER CCXII.

AN ACT to provide for a Live Stock Sanitary Commission and a State Veterinarian, and to prescribe their powers and duties, and to prevent and suppress contagious and infectious diseases among the live stock of the State, and to declare an emergency.

[APPROVED MARCH 9, 1889.]

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana*, That a Commission is hereby established which shall be known under the name and style of "The State Live Stock Sanitary Commission." The Commission shall consist of three Commissioners who are practical agriculturists and engaged in and identified with the live stock interests of the State. One of said Commissioners shall be elected for a term of four years, one for a term of three years, and one for the term of two years, whose terms of office shall commence upon the taking and filing with the Secretary of State the oath of office herein provided for, and shall continue in office until their successors are elected and qualified. The said Live Stock Sanitary Commission, as soon as practical after its organization, [shall] appoint an experienced, competent and skilled veterinary surgeon for the State, who at the time of his appointment shall be a graduate in good standing of a recognized college of veterinary surgery, who shall hold his office for the term of two years, and until his successor shall be appointed and qualified, unless for cause he shall be sooner removed from said office by order of said Commission.

SEC. 2. Immediately on the taking effect of this act the State Board of Agriculture shall nominate and the Governor confirm the appointment of three Commissioners, as provided for in section one of this act, and during the annual meeting of the State Board of Agriculture immediately preceding the expiration of the term of any Commissioner, his successor shall be nominated and confirmed by the Governor for a term of four years.

SEC. 3. Said Commissioners and veterinary surgeons, before they enter upon the duties of their said offices, shall each take and subscribe an oath of office similar in form to that required of State officers, and file the same with the Secretary of State

SEC. 4. Each Commissioner shall receive the sum of four dollars per day and necessary expenses for the time necessarily spent in the discharge of the duties herein required of him, and the said veterinary surgeon shall receive such sum for his services as said Commission may from time to time allow him, not to exceed in any one year the rate of two thousand dollars per year, and never to equal that amount unless said Commission should require his entire time to be devoted to said service during said year.

SEC. 5. It shall be the duty of said Commission to protect the health of the domestic animals of the State from all contagious or infectious diseases of a malignant character, and for this purpose said Commission is hereby authorized and empowered to establish, maintain and enforce such quarantine, sanitary and other regulations as it may deem necessary: *Provided*, That the provisions of this act shall not apply to swine.

SEC. 6. It shall be the duty of any person who discovers, or has reason to believe, that any domestic animal belonging to him or her, in his care, or that may come under his observation belonging to other parties, is affected with any disease supposed to be dangerous, contagious or infectious, to immediately report such fact to the Secretary of the Board of Health of the county where such animal is situated, whose duty it shall be to report the fact to said Sanitary Commission.

SEC. 7. It shall be the duty of said Secretary of such County Board of Health to keep a record of all cases so reported to him, including the age, sex and distinguishing characteristics of such animals, and it shall be the duty of such Secretary of said Board of Health to immediately examine, either in person or by a qualified person appointed by him for that purpose, all animals so reported to be diseased, and if they find that said animal or animals are affected with a contagious disease, to immediately report the same to said Commission, or some member thereof, and the said Secretary shall promptly take such measures as he shall deem most expedient to prevent the spread of the disease until said Commission shall be able to relieve him from the charge and care of such animal or animals. All the necessary expenses necessarily incurred by said Secretary of such Board of Health and his agents, in carrying out the provisions of this act, shall be paid in the same manner as are those of the Commission.

SEC. 8. The Commission, or any member thereof, to whom the existence of any infectious or contagious disease of domestic animal or animals is reported, shall forthwith proceed to the place where such domestic animal or animals are and examine the same, and if in his or their opinion any infectious or contagious disease exists, he or they shall prescribe such temporary quarantine and regulations as will prevent the spread of the contagion or infection, and notify the State Veterinarian, who shall forthwith proceed to the place where the said contagious or infectious disease is said to exist, and examine said animal or animals and report his finding to said Commission, who shall at once prescribe and apply such rules and regulations as in their judgment the exigencies of the case may require for the effectual suppression and eradication of the disease; and for that purpose the said Commission may list and describe the domestic animals affected with such disease, and those which have been exposed thereto, and include within the affected district or premises so defined and quarantined with reasonable certainty as would lead to their identification, and no domestic animal liable to become infected with the disease, or capable of communicating the same, shall be permitted to enter or leave the district, premises or grounds so quarantined, except by authority of the Commission. The said Commission shall also, from time to time, give and enforce such directions and prescribe such rules and regulations as to separating, mode of handling, treating, feeding and caring for such diseased and exposed animals as shall be necessary to prevent the two classes of animals from coming in contact with each other, and perfectly isolate them from all other domestic animals of the same class which have not been exposed thereto, and which are susceptible to becoming infected with the disease; and the said Commission and Veterinarian are hereby authorized and empowered to enter upon any ground or premises, and into any building upon such premises, when and wherever it may be necessary to enter, to fully carry out

the provisions of this act. When in the opinion of said Commission it shall be necessary, in order to prevent the further spread of any contagious or infectious disease among the live stock of the State, to destroy animals affected with, or which have been exposed to, any such disease, it shall determine what animals shall be slaughtered, and appraise the same as hereinafter provided, and cause the same to be slaughtered and the carcasses disposed of as in their judgment will best protect the health of domestic animals in that locality.

SEC. 9. When the Commission shall have determined the quarantine and other regulations necessary to prevent the spread among domestic animals of any malignant, contagious or infectious disease found to exist among the live stock of the State and given their orders as hereinbefore provided, prescribing quarantine and other regulations, it shall notify the Governor of the State thereof, whose duty it shall be to at once issue his proclamation proclaiming the boundary of such quarantine as fixed by such Commission, together with the orders, rules and regulations prescribed by said Commission, which proclamation may be published by written or printed handbills posted within the boundaries or on the lines of the district, premises, places or grounds quarantined: *Provided, however,* That if the Commission decide that it is not necessary, by reason of the limited extent of the district in which such diseases exist, that a proclamation should be issued, then none shall be issued, but such Commission shall give such notice as may to it seem best to make the quarantine established by it effective.

SEC. 10. Whenever said Commission shall direct the killing of any domestic animal or animals, it shall be the duty of the Commissioners to appraise the animal or animals condemned, and in fixing the value thereof the Commissioners shall be governed by the value of said animal or animals at the date of appraisement.

SEC. 11. When any live stock shall be appraised and killed by order of the Commission, it shall issue to the owner of said stock so slaughtered a certificate showing the number and kind of animals killed, for what reason killed, and the amount, in their judgment, to which the owner is entitled for said animals from the State, and report the same to the Governor of the State, which certificate, if approved by the Governor, shall be presented to the Auditor of State, who shall draw his warrant therefor on the State Treasury, payable out of any moneys in the Treasury, not otherwise appropriated.

SEC. 12. When any animal or animals are slaughtered under the provisions of this act by order of the Commission, the owner thereof shall be paid therefor the appraised value as fixed by the appraisement hereinbefore provided for: *Provided, however,* That the right to payment for animals slaughtered by order of the Commission under the provisions of this act shall not extend to the owners of animals which have been brought into the State in a deceased condition, or from a State, country, territory or district in which the disease with which the animal is affected, or to which it has been exposed, exists. Nor shall any animal be paid for by the State which may have been brought into the State in violation of any law or quarantine regulation thereof, or the owner of which shall have violated any of the provisions of this act, or disregarded any rule, regulation or order of

the Live Stock Sanitary Commission, or any member thereof, made under the provisions of this act. Nor shall any animal be paid for by the State which came into the possession of the claimant with the claimant's knowledge that such animal was diseased, or was suspected of any disease, or having been exposed to any contagious or infectious disease.

SEC. 13. Any person who shall have in his possession any domestic animal affected with any contagious or infectious disease, knowing such animal to be so affected, or after having received notice that such animal is so affected, who shall permit such animal to run at large, or who shall keep such animal where other domestic animals not affected by, or previously exposed to, such disease may be exposed to its contagion or infection, or who shall sell, ship, drive, trade or give away such diseased animal or animals which have been exposed to such infection or contagion, or who shall move or drive any domestic animal in violation of any direction, rule, regulation or order establishing or regulating any quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than ten dollars nor more than five hundred dollars for each of such diseased or exposed domestic animals which he shall have thus permitted to run at large, sell, ship, drive, trade or give away in violation of the provisions of this act: *Provided*, That any owner of any domestic animal which has been with or exposed to any contagious or infectious diseases may dispose of the same after having obtained from the State Veterinarian a certificate of health for such animal or animals.

SEC. 14. Any person or corporation who shall knowingly bring into the State any domestic animal or animals which are infected with any contagious or infectious disease, or any animal or animals which have been exposed to any such contagious or infectious disease shall, for every such offense, forfeit and pay to the State not less than one hundred dollars nor more than five hundred dollars, to be recovered by suit in the name of the State.

SEC. 15. Any person who owns or is in possession of live stock which is infected, or which is reported under the provisions of this act to be infected with any contagious or infectious disease, who shall willfully prevent or refuse to allow the State Veterinarian or Commission, or other authorized officer or officers to examine such stock, or shall hinder or obstruct the State Veterinarian or other authorized officer or officers in any examination of, or in attempts to examine such stock, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than ten dollars nor more than five hundred dollars.

SEC. 16. Any person who shall knowingly violate, disregard, evade or attempt to violate, disregard or evade any of the provisions of this act, or who shall knowingly violate, disregard or evade any of the rules, regulations, orders or directions of the Live Stock Sanitary Commission establishing and governing quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than ten dollars nor more than five hundred dollars.

SEC. 17. The Commission provided for in this act shall have power to employ at the expense of the State such persons and purchase such supplies and materials as may be necessary to carry into full effect all necessary orders given by it.

SEC. 18. The Commissioners shall have power to call upon any Sheriff, Deputy Sheriff or Constable to execute their orders, and such officers shall obey the orders of said Commissioners, and the officers performing such duties shall receive compensation therefor as is provided by law for like services, and shall be paid therefor in like manner as other expenses of said Commission are paid. And any officer may arrest and take before any Justice of the Peace of the county any person found violating any of the provisions of this act, and such officer shall immediately notify the Prosecuting Attorney of such arrest, whose duty it shall be to prosecute the person so offending according to law.

SEC. 19. Whenever the Governor of the State shall have good reason to believe that dangerous, contagious or infectious disease has become epizootic in certain localities in other States, Territories or countries, or that there are conditions which render such domestic animals from such infected districts liable to convey such disease, he shall by proclamation prohibit the importation of any live stock of the kind diseased into the State, unless accompanied by a certificate of health given by a duly authorized veterinary surgeon, and all such animals arriving in this State shall be examined immediately by said Commission or some member thereof, and if he or they deem it necessary he or they shall have said animal inspected by the State Veterinary Surgeon, and if, in his opinion, there is any danger of contagion or infection, they shall be placed in close quarantine until such danger of contagion or infection is passed, when they shall be released by order of said Commission or some member thereof.

SEC. 20. For the purposes of this act, each member of the Live Stock Sanitary Commission is hereby authorized to administer oaths and affirmations.

SEC. 21. The Commission is hereby authorized and required to coöperate with any Board, Commission or officer acting under any present or future act of the Congress of the United States for the suppression and prevention of contagious and infectious diseases among domestic animals, and the same right of entry, inspection and condemnation of diseased animals upon private premises is hereby granted to the United States Board, Commission or officer as is hereby granted to the State Live Stock Sanitary Commission.

SEC. 22. Whenever it is deemed necessary by the State Live Stock Sanitary Commission to supervise and inspect any of the lines of transportation in this State and the stock yards in connection with the same, suitable inspectors shall be appointed by said Commission, whose duty it shall be to examine such lines of transportation and stock yards as to condition, manner of transporting stock, and such other matters as such Commission may direct, and report such examination in detail to said Commission, and the expense of such examination shall be paid by the corporation or corporations or individuals in charge of such lines of transportation or stock yards. Any such corporation, corporations or individuals owning or operating such lines of transportation or stock yards shall conform promptly to all regulations made by said Sanitary Commission, of which they shall have notice from such Commission, and for any neglect or omission to comply with such regulations as herein provided, they shall be subject to the fines and penalties in this act provided, to be enforced and collected according to the provisions of this act.

SEC. 23. That whenever by act of the Congress of the United States the payment of the appraised value of domestic animals slaughtered for the purpose of preventing the spread of infectious and contagious diseases among any class or classes of domestic animals in the several States shall have been provided and the necessary appropriation for such payment out of the National Treasury made by such act of Congress, then, from and after that date there shall be no further payment made out of the State Treasury for domestic animals of the class or classes payment for which is so provided by said act or acts of Congress, by order of said State Live Stock Sanitary Commission.

SEC. 24. The State Live Stock Sanitary Commission shall make annually a detailed report of its doings, to the Governor, which report shall by the Governor be transmitted to the Legislature at its next regular or called session.

SEC. 25. That an emergency exists for the immediate taking effect of this act; therefore, the same shall be in force from and after its passage.

MEMBERS OF THE COMMISSION.

George W. Hall, Raleigh, Rush County, Indiana.

M. S. Claypool, Muncie, Indiana.

V. K. Officer, Madison, Indiana.

Mortimer Levering, Secretary, Lafayette, Indiana.

F. A. Bolser, State Veterinarian, New Castle, Indiana.

Office of Board: Rooms State Board of Agriculture, Indianapolis, Indiana.

Since our last report we have visited a great many dairy herds, and have found a very small per cent. of tubercular trouble existing, and in every case have succeeded in eradicating the disease from the herds. We have not allowed a single outbreak of Texas fever to occur in the last year, but must admit having some very narrow escapes. We have had a number of cases of specific opthalma, but succeeded in not allowing the disease to spread in any locality. Animals yield readily to treatment by keeping in well darkened and well ventilated stables, giving the following treatment: Boracic acid, 1 oz.; aqua distil, 2 pts.; applied twice a day to eyes. All have recovered with the exception of occasional loss of an eye.

We have had very few deaths from cornstalk disease in cattle, owing to the fact that our feeders do not depend wholly on cornstalks for feed. The fungi was not very prevalent in the past year.

We have had a great loss in calves, due to scours, in some localities, this occurring before our notice had been called to the trouble. We had no trouble in checking the disease by giving the following treatment: Salol, bismuth sub. nit., aa. gr. iii; mix; give in two ounces of milk every three hours until bowels are regulated. If accompanied with pain and bloody discharge, give the following: Morphine, gr. x; tinct. capsicum; fl. ext. belladonna, equal parts, 1 dr.; fl. ext. ginger, 2 dr.; raw linn. oil, 1 pt.; mix sig., give one ounce every two hours until relieved.

We have had a very great loss in sheep in Northern Indiana from the effect of *tenia frambonita*, or tape worm. The feeders failed two years ago to get the required amount of native lambs for feeding, went to Chicago and bought Western lambs; hence the source of infection. We visited a great many herds, holding post mortems in a great many instances, and in every case found the same trouble. We advised them to thoroughly disinfect the premises, not allowing new herds to come in contact with infected premises by any means. The animals were so thoroughly infected that we considered it useless to advise treatment of the same; but we are satisfied in our minds that they will take the necessary precautions to stamp out the trouble when once enlightened. We have had very few cases reported to us of stomach worms in lambs, but three doses of santonine is the most successful treatment for this trouble. There are many other parasitic diseases affecting sheep, but none have been reported to us as existing in Indiana.

When our appropriation became exhausted last year we had glanders under our control to such an extent that in three months we only had one case reported; but owing to the fact that during this time there were three car-loads of Chicago street-car horses shipped into northwestern Indiana, we are now in the midst of an outbreak which is working a very great hardship to many innocent farmers, as well as ourselves. We are compelled to travel all night in some instances in order to catch the diseased animal. We have in the five weeks just past destroyed twenty-two cases of glandered horses, the majority of which were in Jasper County. It will require one-half of the annual appropriation to stamp out the existing trouble in Jasper County alone, owing to the start it had gotten while we were unable to look after the trouble on account of no funds. It will be a very lucky thing if there are no deaths occurring in the human family from this outbreak. Parties not knowing that such a disease exists, in many instances would allow three or four head to die before reporting cases. It will, as we stated in our last report, take at least ten thousand dollars to control the contagious diseases with which our stock are annually coming in contact. Owing to the fact that the enormous importation of Mexican sheep and cattle into our central States, and all of them liable to have contagious or infectious troubles, still continues, we are compelled to be constantly on the watch; however, we have prevented an outbreak from this source of any kind whatever, thus far.

F. A. BOLSER,
State Veterinarian.

The following is a report of the work done by the Commission from November 1, 1895, to July 1, 1897:

The State Veterinarian, F. A. Bolser, accompanied by the Board of Commissioners, visited the places named hereinafter where cases were reported of horses, cattle or sheep being suspected as having symptoms of contagious or infectious diseases. A detailed report of each is on file. The places visited are as follows:

<i>Date.</i>	<i>Name.</i>	<i>County.</i>
November, 1895 . .	50 quarantined cases Texas fever	Putnam and Hendricks.
" "	. . Martin Hatfield	Vanderburgh.
" "	. . J. J. Ferrell	Vigo.
" "	. . I. B. Preston	Vigo.
" "	. . J. S. Decker	Clay.
" "	. . Walter Culp	Tippecanoe.
" "	. . Culp & Sons	Tippecanoe.
" "	. . L. Jacquene	Delaware.
" "	. . F. C. Whitton	Rush.
December, "	. . W. S. Nichols	Lake.
" "	. . J. Sowle	Wells.
" "	. . W. S. Cotton	Wells.
" "	. . F. Oaxman	Knox.
" "	. . M. Fredericks	Tippecanoe.
" "	. . D. Campitt	Huntington.
" "	. . J. B. Preston	Vigo.
January, 1896	. C. Viney	Carroll.
" "	. S. Burroughs	Carroll.
" "	. M. Green	Vigo.
" "	. S. Burroughs	Carroll.
" "	. F. Oaxman	Knox.
" "	. H. J. Wolf	Allen.
" "	. William Fulton	Allen.
" "	. C. Schrepferman	Clay.
" "	. William House	Vigo.
February, "	. J. W. Vandever	Johnson.
" "	. J. S. Davis	Warrick.
" "	. W. F. Culp	Tippecanoe.
" "	. F. Whitton	Rush.
March, "	. Stockyards	Marion.
April, "	. M. Green (twice)	Vigo.
" "	. F. Burroughs	Carroll.
" "	. J. H. McCormick	Allen.
" "	. H. B. Hemley (twice)	Henry.
" "	. Mt. Vernon	Posey.
" "	. Jas. Irwin	Posey.
" "	. Wm. Lowe	Vanderburgh.
" "	. John R. Hartzell	Allen.
" "	. J. S. Hill	Allen.
" "	. John Schaffer	Allen.
May, "	. P. Freeland	Pike.
" "	. F. W. Voss	Vanderburgh.
" "	. R. Kemp	Vanderburgh.
" "	. J. Junkers	Posey.

<i>Date.</i>	<i>Name.</i>	<i>County.</i>
May, 1896	Wm. Mills	Carroll.
"	W. Schrepferman	Clay.
"	W. R. Jones & Sons	Clay.
June,	F. Coon	Posey.
"	Lafayette	Tippecanoe.
July,	A. Adkins	Laporte.
"	J. H. McCormick	Allen.
"	W. C. Wells	Lake.
"	L. Arndt	Tippecanoe.
"	W. H. Milliner	Jasper.
August,	C. W. Nagel	Vigo.
"	Wm. Merseick	Marion.
"	Stockyards	Marion.
September,	M. L. Moore	Blackford.
"	Hall & Harris	Rush.
"	McCann Bros	Rush.
"	C. F. Cheney	Vanderburgh.
October.	M. Morris	Vigo.
November,	C. W. Wells	Lake.
"	L. Arndt	Tippecanoe.
December,	W. McDowell.	Carroll.
"	T. Gustin	Carroll.
January, 1897	L. Miller.	Delaware.
"	Powell & Bailey	Henry.
"	W. McDowell (twice)	Carroll.
February,	H. Robinson	Henry.
"	W. A. Thruston.	Lake.
"	F. Fuller.	Lake.
"	C. B. Cooper	Fountain.
March,	F. Norris.	Rush.
"	C. Batchfield	Wayne.
"	P. Sutton.	Johnson.
"	G. Steele	St. Joseph.
April,	G. Stowell	Lake.
"	J. Jackson	Lake.
"	Indianapolis	Marion.
"	G. Steele	St Joseph.
"	L. Miller	Delaware.
"	B. M. Vanderbilt	Benton.
"	J. Kelley and others	Lagrange.
"	P. Kelley	Hancock.
"	J. S. Buckles	Marion.

Since November 1, 1895, to July 1, 1897, horses were killed, as follows:

Number killed	22
Total cost to the State	\$200 00
An average of	\$9 09

The number killed in different counties was as follows:

Tippecanoe	2
Rush	1
Knox	2
Carroll	1
Vigo	3
Allen	5
Clay	1
Johnson	1
Vanderburgh	1
Lake	3
Benton	2
Total	22

Since November 1, 1895, to July 1, 1897, cattle were killed, as follows:

Number killed	15
Total cost to the State	\$80 00
An average cost of	\$5 33

The number killed in different counties was as follows:

Vigo	11
Henry	3
Posey	1
Total	15

The expenses of the Commission were as follows:

To horses killed by order of Board	\$200 00
To cattle killed by order of Board	80 00
To local Veterinarians	34 00

To amount paid Commissioners, State Veterinarian and Secretary, including traveling expenses:

To George W. Hall, Nov. 1, 1895, to July 1, 1897	\$988 25
To Jas. M. Sankey, Dec. 1, 1895, to July 1, 1897	400 30
To M. S. Claypool	673 60
To Samuel Bowman	159 00
To V. K. Officer	86 05
Total	\$2,307 20

To F. M. Bolzer, State Veterinarian	\$2,782 30
To Mortimer Levering, Secretary	526 70

Total paid Commission, including expenses	\$5,616 20
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Total amount paid by the State	5,930 20
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On July 1, 1897, the Commission was composed of the following members:

Comr. George W. Hall, Raleigh, Rush County, President.

Comr. M. S. Claypool, Muncie, Delaware County.

Comr. V. K. Officer, Volga, Jefferson County.

F. A. Bolser, New Castle, Henry County, State Veterinarian.

Mortimer Levering, Lafayette, Tippecanoe County, Secretary.

Respectfully submitted,

GEORGE W. HALL,
M. S. CLAYPOOL,
V. K. OFFICER,
Commissioners.

F. A. BOLSER,
State Veterinarian.
MORTIMER LEVERING,
Secretary.

REPORT
OF THE
TWENTY-SECOND ANNUAL MEETING
OF THE
INDIANA WOOL GROWERS' ASSOCIATION.
Tuesday January 5, 1897.

Meeting called to order at 7:30 P. M. by Clark Phelps, of Newcastle, President of the Association.

PRESIDENT'S ADDRESS.

It is a source of much pleasure to me to again be able to meet with the wool growers at our annual meeting, thankful to an All Wise Providence that He has again smiled upon us. I do not now remember that death has invaded our ranks in the last year; if it has been the case anywhere in the State before this annual meeting has completed its labors, you will see to it, I trust, that a suitable memorial or resolution be made in honor of him. I believe that it is profitable that we lay aside the cares of the farm for a day or two each year and come together, not only that we might renew acquaintance, but that we might get each other's experience in the management of his flocks during the year. I suppose that there are none of us but can recall some mistake or mismanagement of the flock during the year which he expects to guard against the coming year, so that experience will be a benefit to other members of the Association. It seems to make no difference how little the President of this Association may know about the best means to secure the object of its organization, custom compels him to tell what little he does know. One of the puzzling questions to me is why there is so general a lack of interest in an industry so necessary to the health and wealth of all the people. I have not at hand any statistics to show just what proportion of the farmers of the State raise

sheep, but I presume other localities are not very far different from my own. I live in Henry County, six miles from the county seat, New Castle. In going to the county seat by two different roads, I travel twelve miles; in that twelve miles are thirty-five farmers; only ten of them raise sheep, less than one third. Now, it is very clear to my mind, that every farmer, although he may be a small farmer, can keep a few sheep at a very small cost and bring in some revenue twice in the year without infringing upon any other industry of the farm.

Now, then, how are we to interest the masses in this industry? The organization and maintaining of this Association is one of the means; a few public sales like we have had in the past year is a good help; getting our literature, such as "The Wool Grower" and some others that are now published, more thoroughly circulated among farmers. We ought to raise enough wool to supply all the demands of our own country. Wool can not be dispensed with; the members of this Association are dressed in wool; there is wool in every garment that covers the body, underclothes and all. An immense amount of wool must be had; it must be raised either at home or abroad. I believe we can raise sheep the carcass of which can go to England or to our own cities and manufacturing places to feed men that are engaged in other pursuits than farming, and at the same time raise wool that will clothe the whole population of our country.

I shall not attempt a discussion of the tariff at this time; it has been discussed before this Association over and over again, until I presume there could hardly be found a wool grower in the country but what is a believer in a protective tariff. Suffice it to say that the outlook is much brighter than a year ago at our annual meeting. We have some good promises from the incoming administration, but we should not lie still and sleep on our oars. Even at this late day our Representatives and Senators should still be petitioned to give us the much needed protection.

I have had very little complaint in regard to our present dog law. So far as I know it in the main meets the demands of the wool growers of the State. We have, however, in our Association some members that have given that part of the work their special attention; if any change is needed we will arrange for getting the proper recommendations before our Legislature.

In conclusion, let me say there is encouragement in the future for the wool grower, with the prospect of a revival, to some extent, of the business interests of our country. With the prospect of a tariff to protect us from foreign competition, there is certainly encouragement for us to lift up our heads and pursue with vigor the industry we have met here this evening to talk about and try to promote.

It was moved and seconded that a committee be appointed to review the President's address and select the points in it of special interest and make recommendations concerning it.

Motion adopted.

The President appointed as such committee Mr. Cowgill, Mr. Guthrie and Mr. Tomlinson.

SHEEP FEEDING EXPERIMENTS AT PURDUE UNIVERSITY.

BY C. S. PLUMB, LAFAYETTE.

I had hoped that when this subject was placed on the program that I would be able to present some material which I will not be able to. I had hoped that I might be able to give you some definite information as to the use of rape in this State as a forage crop for sheep. We had a good deal of experimental work this summer, but have not yet succeeded in growing it at the station on the successful scale that it is grown farther north.

We had a flock of sheep, but dogs got into the flock after the experiment was in progress and ruined the flock. We had redemption from the township trustees financially. I am going to give you some facts about two feeding experiments, the results in growth of which, while they are not as large as we had anticipated, may present some facts of interest. The sheep were in good condition all during the experiment, and any gains or losses are not apparently attributable to anything wrong in the health of the animals.

The first subject that I want to refer to is a comparison of the relative merits of corn and wheat for feed. I secured from a sheep grower in Tippecanoe County a flock of sheep that were unusually uniform in character. This man is one of the most practical handlers of sheep that I know of in our part of the State. He let us have the use of the sheep for the experiment, and afterwards took them back, and he was very well satisfied with the condition of the sheep at the time he took them. This was begun in the fall of 1893, or almost in the winter. The sheep, twelve in number, were lamb wethers, six of them being grade Shropshires and six were grade Cotswolds. Three of each were placed in each of two lots. They were kept in confinement during the night and given exercise during the day in a lot where they could get nothing to eat except what we should feed them. When the sheep were started in the experiment they were quite even in weight, the weight of lot one being 478½ and of lot two 483½ pounds. The feeding began December 14. In our experiments we keep a personal record, and we weigh the individual animals once a week, and about the middle of the day or in the afternoon before feeding, so that water or feed will affect the weights in as slight a manner as possible. One of these lots were fed whole wheat and the other shelled corn. The rations otherwise were exactly alike. Only such grain and roots were fed as they would eat up clean. The animals were given free access to water and no record made of the amount they drank. The gains which were made by these wethers were as follows: The experiment was begun on December 13 and ran until February 21. The gains varied, and yet the gain was the same for each lot. Lot one made a gain of 111.5 pounds and lot two the same, so that we found no difference here. In order to let you have an idea of what sort of gains they made, I will give you the results in average daily gain which was made:

GAIN OF LAMBS DURING EXPERIMENT.

Wheat Fed.

LAMB.	WEIGHT, POUNDS.		TOTAL GAIN.	AVERAGE DAILY GAIN.
	December 13.	February 21.		
No. 20	84	104.5	20.5	.29
No. 21	75.5	94.5	19	.27
No. 23	87.5	101.5	14	.20
No. 27	82.5	97.5	15	.21
No. 29	88	112.5	24.5	.35
No. 30	66	84.5	18.5	.36
Total	483.5	595	111.5	. . . . .

Corn Fed.

No. 22	85	97.5	12.5	.17
No. 24	79.5	96	16.5	.23
No. 25	75.5	101	25.5	.36
No. 26	79	97.5	18.5	.26
No. 28	76.5	99.5	23	.32
No. 31	84	99.5	15.5	.22
Total	479.5	591	111.5	. . . . .

The above table shows that each lot made the same gain in total weight, namely, 111½ pounds each. The daily gain for each lamb was about one fourth of a pound.

The relationship which exists between the production of the flesh and the cost of food is, of course, the important one. In taking the cost of the food into account I have given the cost of food as we buy it in the market. If the cost to the grower was taken into account it would reduce the cost of laying on flesh. We gave no credit to the gain of wool, which should be credited to the profit if we had had the animals to shear. The amount of food which was eaten was as follows:

	Lot I.	Lot II.
Clover hay	414 lbs.	424½ lbs.
Beets	141 "	141 "
Oats	17½ "	17½ "
Wheat	478 "	
Corn		463½ "

The following prices are given as those at which the above feeds are or would be sold in the market per cwt.: Clover hay, 40 cents; beets, 15 cents; oats, \$1.00; wheat, 90 cents; corn, 85 cents.

The money value of the food eaten by the two lots is shown in the following table:

	<i>Lot I.</i>	<i>Lot II.</i>
Clover hay	\$1 66	\$1 70
Beets	21	21
Oats	17½	17½
Wheat	4 30	. . .
Corn . . . . .	. . .	3 94
Total	\$6 34½	\$6 02½

The highest price such lambs were bringing in market at the time this experiment was completed was \$3.60 per hundred. At this figure each lamb would return \$4.01 for the gain.

The highest price that such lambs were bringing in the market was \$3.60 per hundred. At these figures each lamb would return \$4.01 for the gain made. We find the cost of a pound of gain for the first lot was $5\frac{7}{10}$ cents per pound, and the other lot $5\frac{1}{10}$ cents per pound. The animals were in good condition. They were taken off from pasture and received no grass. They got about a pound of beets a day, and the gains were made on animals that were originally in pretty good flesh. So the amount of flesh was not as large as is sometimes obtained.

The recent introduction of the shredding of corn fodder has attracted a good deal of attention in this country for feeding all classes of stock, and at Purdue we have used it for cattle and horses and sheep. It was thought that it would be an interesting experiment to feed a lot of sheep on shredded corn fodder and another lot on clover hay. We secured twelve good stock wethers, dropped about April, and they were in good flesh. Ten of them were very excellent lambs, indeed. These twelve were divided into two lots, and one lot was fed the shredded fodder and wheat, and the other lot was fed clover hay and given the same grain, while each wether in each lot was fed about one pound of beets a day. They were fed twice a day, about 7:30 in the morning and 4:30 in the afternoon and given free access to water, and were weighed every seven days. No chance was allowed these animals to eat any feed except such as was under our control. We bedded them with shavings while making the experiment. The sheep were in this experiment 122 days. Those which were fed corn fodder were fed 1,452 pounds and 15 ounces of the fodder. They refused 573 pounds and 3 ounces of it; they refused 39 per cent. of the fodder and ate 879 pounds and 12 ounces. Those who had clover were fed 1,899 pounds 13 ounces. They refused 182 pounds 11 ounces; or, they refused 9 per cent. You see that is quite a wide contrast.

Now, taking the feed into account, we find a very wide difference in its cost. I take the cost as one would find it in the market, and not as it costs one to produce it. The cost of the corn fodder was \$2.50 per ton; clover hay, \$8.00 per ton; wheat, 1 cent per pound, and beets at \$3.00 per ton.

COST OF FOOD FOR LOT I.	COST OF FOOD FOR LOT II.
880 lbs. corn fodder at \$2.50 ton . \$1.10	1,717 lbs. cover hay at \$8.00 ton . \$6.87
328 lb-. wheat at 1 cent lb 3.28	328 lbs. wheat at 1 cent lb 3 28
728 lbs. beets at \$3.00 ton 1.09	728 lbs beets at \$3.00 ton 1.09
Total \$5 47	Total \$11.24

In this experiment lot one, fed corn fodder, gained 77.4 pounds, and lot two, fed clover, gained 193.2 pounds. There was a decided gain by each animal in lot two, while in the case of those fed corn fodder they did not do nearly so well, and one lost just ha'f a pound during the experiment. The animals ate the clover hay cleaner and better, and relished it more. We kept the others on the corn fodder all the time during the experiment, but we realized that we were not getting satisfactory results, yet there was not an animal out of condition during the experiment, but the growth was very slow. The corn fodder we fed then was not as good corn fodder as we are feeding this year, although it was sweet and not inferior in quality.

DISCUSSION.

Mr. Dungan. Which was the most profitable, the feeding of clover hay, or the shredded fodder?

Mr. Plumb. The cost per pound of gain where the shredded fodder was fed was 7 cents; the cost per pound of gain where the clover hay was fed was 5.8 cents per pound.

Sid Conger. I am trying the experiment myself. I am feeding about two-thirds of my sheep on shredded fodder, and have been for two or three months, and I don't think they are doing any good at all. They are wasting more than half of it. They will go out and eat straw and leave the fodder, and we have more bedding than we know what to do with. While I like to get the fodder off the field, there is a good deal of objection to feeding it shredded to stock. It is hard to handle it with a fork. If you put it away, you have to have a man at the end of the fork to pull it off the fork when you use machinery. Horses don't seem to like it at all. The cattle seem to eat it all right, but they eat the blades and not the shuck.

Mr. Williams. That is about all we are feeding. We have been feeding it for about ten years. We used a cutting box at first; this year we got a shredder. We are not feeding any hay this winter, and our sheep are in good condition. Three years ago we had a flock of 45 ewes, and we fed part of them on hay and part of them on this fodder. When spring came, the ones that were fed on fodder were in better condition than the others, and their lambs were better. We were very well pleased with our use of the fodder. It is cheaper than we can afford to raise clover hay.

The last time we plowed our corn we sowed rape. Now we get the corn, and after the corn is cut we get a good pasture. We are not out the use of the land for pasture for the fall, and we have the corn for the hogs and horses, and the fodder for the sheep.

Mr. Plumb. When did you sow the rape?

Mr. Williams. In April, and kept on sowing up until July.

Mr. Plumb. Which sowings were the most satisfactory?

Mr. Williams. That which was sowed about the 15th of April. The seed costs about \$6 a hundred. It should be sowed about six pounds to the acre if you have plenty of seed; all the way from two to six pounds can be sown.

Mr. Plumb. I want to bring out one point which I think is, perhaps, rather misunderstood. Mr. Williams says that the ewes did first rate and that they lambed better than the others. I referred to wethers that we were trying to get some flesh on. The ewes are simply standing still nibbling their feed; but the question is, Could you feed a bunch of sheep with shredded fodder so that you could put them on the market in satisfactory condition?

Mr. Williams. Those ewes we fed on fodder were in better condition in the spring than the ones we fed on clover hay. We fed a few sheep last winter that we wanted to take extra good care of, and they had no food except the fodder and some grain.

Mr. Robe. I should like to ask about the keeping of fodder.

Mr. Dungan. Perhaps that is where some of the trouble lies. I imagine that Mr. Conger, and others who have had such bad luck with it, have cut it in bad condition; that is, it was not just right to cut. Then, perhaps, some others put it off too long. Shredded fodder, to be good and sweet, and all right for stock, should be shredded within a month or three weeks after it is cut. Too many wait until the rains come and it gets black and unsuitable for shredding.

Mr. Plumb. The corn we put up was in good condition and not black at all.

Mr. Phelps. I believe Mr. Plumb said the animals were kept in an enclosure where they could get nothing else to eat, and had access to water. Now, I want to know if they had free access to salt?

Mr. Plumb. Yes, but I want to say, in this connection, that we feed shredded fodder to our horses and cattle, but not to our sheep. We had a fine field of corn fodder as any one would want to put into a barn, and if any corn fodder could be put up better, I would like to know how to do it. Our cattle will eat it up cleaner than they will the cut fodder. Our horses will leave quite an amount of cut fodder, but not so much of the shredded fodder. We have an experienced feeder there. He says that he prefers the shredded to the cut fodder.

J. J. Smith. Some say that timothy hay is death to sheep. I would like to know where the bad qualities lie in timothy hay.

Mr. Thompson. I can remember when we cut our timothy hay after the seed was mostly swept off, and we stacked it out in the field and let the sheep run to it without any protection from the rain, and it did kill them; but since we have got to cutting the hay at the right time, and the sheep are protected and fed some grain, it does not kill them.

WHAT SEASON OF THE YEAR SHOULD LAMBS BE SOLD FOR THE
BEST PROFIT, AND SHOULD THEY BE DOCKED
AND CASTRATED?

BY J. B. HERKLESS, CARTHAGE.

(Read to the Association by Mr. Robe.)

I shall not endeavor to discuss this subject at length, as it is a difficult question to determine the exact time to market lambs, for the best profits vary according to supply and demand. Ordinarily the early spring market is the best, as there are very few sheep breeders properly fixed to raise early market lambs.

One has two chances in preparing for early market, if the price does not suit; you can feed for the fall market, and I would say in raising lambs for market that one of the most important items is the selection of your breeding flock. I should select the kind of breed that suited my fancy and get medium sized ewes, as they are as a general rule the hardiest and best feeders and more uniform in breeding. In the selection of a ram get one of spritely appearance, with good chest and plenty of room for food, and keep him away from the ewes during the day and let him run with them at night—giving him plenty of food during the breeding period, as a little pains in breeding is a large item in your success in procuring a good, healthy crop of lambs.

Professor Stone's letter in the "Breeder's Gazette" states that he saw on April 1, 1896, sixty head of fifty-pound lamb purchased at nine cents per pound, live weight. He further states that Mr. Swift in calling attention to them said that in thirty days hence these lambs would be worth less than to-day.

In the latter part of July there were lambs sold in the Chicago market that brought six cents and weighed seventy-five pounds. You will see by comparison the lambs brought just the same with three months less feeding in favor of the April lambs.

Marketing early has some striking advantages—removing them early gives the ewes time to pick up for early breeding. August and September are the critical months of a lamb's life, especially if it is a warm, rainy season, as they are liable to be effected with paper skin and other parasites. As to the second proposition, whether or not it is best to castrate and dock lambs, I would answer in the affirmative, for the following reasons: A weather will bring from fifty cents to a dollar more in market than a ram, and if the early market does not suit they will thrive and take on flesh better in the after part of the season, especially if you have ewes running with them. And in regard to docking them, I am sure it adds a great deal to the appearance of the lambs. The first time my attention was called to the importance of docking was several years ago, when I saw a bunch of Canada lambs in the Buffalo market. Before sending them to market you go over them with the shears and trim the wool so as to give them as good appearance as

possible, for the more attractive you make them appear, the better sale you will find for them.

While it may appear of little importance as concerns the value of the flock, it is what attracts the buyer that brings the top price.

I have no doubt that many of you have had men say I do not want an over-fell ram for breeding purposes; but when they go to select one to purchase, they pick on the one in the best flesh, simply because it is the most attractive.

DISCUSSION.

Mr. Dungan. We had 125 lambs this year, and we kept them through July and August, and we lost thirty-five. I see we have a veterinary surgeon here this evening, and I presume he knows something about this scourge that is spoken of in this paper. It was something we had never had before in our part of the country. This paper refers to it as "paper skin."

I usually have three or four hundred lambs every year, and have usually been lucky with them. Last year I had a flock of lambs on a farm some distance from where I live, something over a hundred in the flock, and some time in September I was at the farm, and the man who had charge of the farm said he had lost four or five lambs. The water that we use there for all the stock is from drilled wells, but one of the pumps had got out of order, and there were some branches and ditches in the pasture that had water in them that I found the sheep had been drinking, and that was all the water they had had for some time. I directed him to go to the drug store and get two or three packages of Summer's Worm Powders. He did so, and fed it pretty liberally to the lambs, and we have had no trouble with them since. I am satisfied that they became diseased from drinking foul water.

Mr. Guthrie. My experience has been the same as the writer of that paper. I think the important thing is to have your lambs come early. We castrate our lambs when they are about two weeks old. I think a good many of us don't pay strict enough attention to the breeding part, and see that the matter is attended to promptly. I seldom lose a sheep, and don't know whether it happens so or is because we always sell everything that is not perfect in fleece and form.

SOME OF THE INTERNAL PARASITES OF SHEEP.

BY PROFESSOR BITTING, PURDUE UNIVERSITY.

Gentlemen of the Indiana Wool Growers' Association:

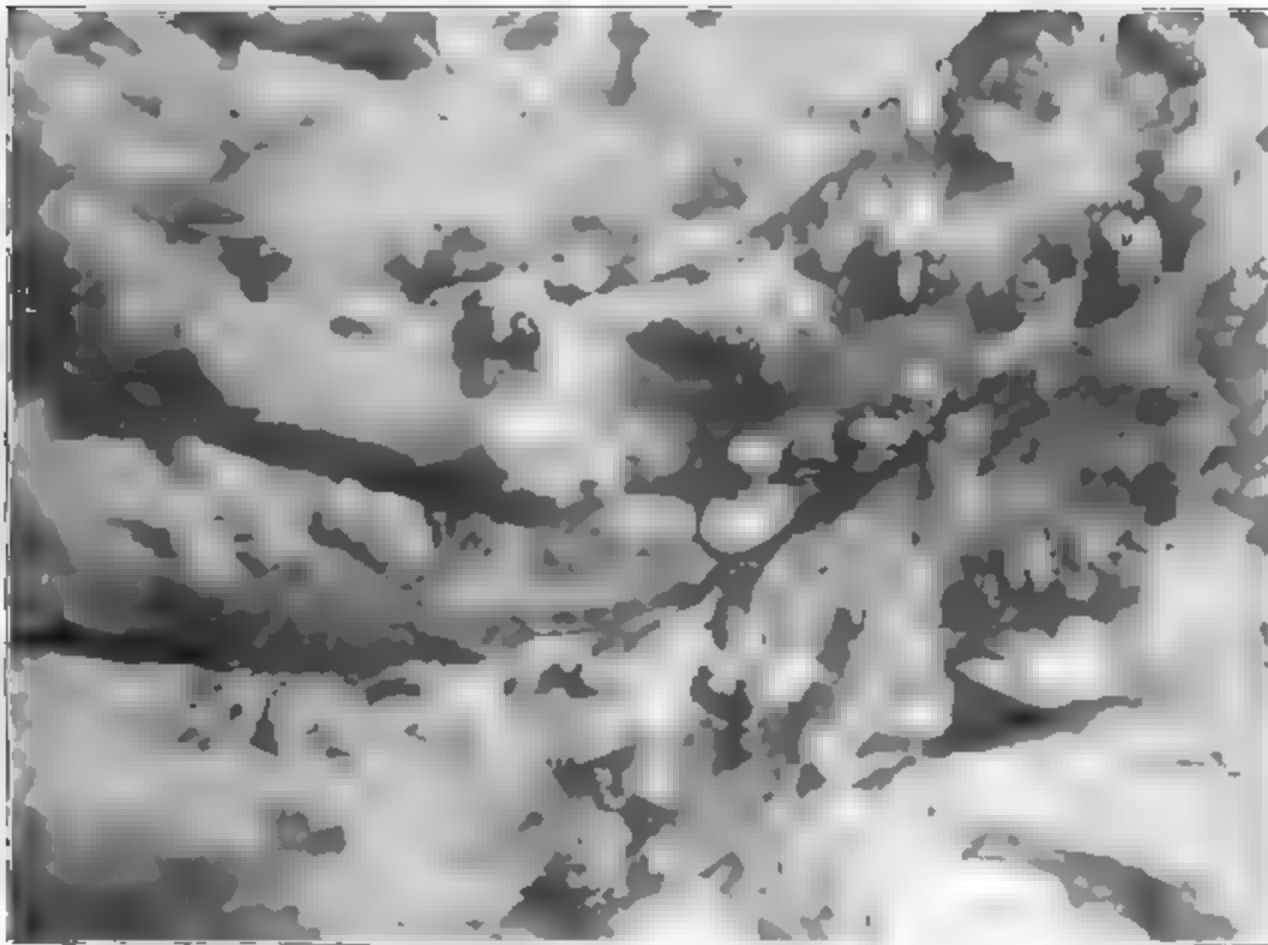
If I were to give a description of all the parasites of sheep and begin at the highest order and go downward, I would need to begin with the dog. Surprising as it may seem, the dog is responsible for one-third of the deaths of sheep in this State. According to the State Statistician, the total loss of sheep in this State for the year ending April 1, 1895, was 92,824; 62,100 dying of disease and 30,724

killed by dogs. For the year ending April 1, 1896, the total loss was 66,673, of which 45,308 died of disease and 21,365 were killed by dogs. This is certainly an unfavorable commentary upon the value of the dog to the sheep industry in this State. Half as many sheep are killed by dogs as die from disease.

The remedy for this evil is in your hands—lead, in huge alopathic doses. The dose is to be administered when the first symptom appears—the presence of a dog on the premises when unaccompanied by an owner.

It was not my intention to consider the dog as a parasite upon sheep, but the figures are of such magnitude that there can be no escape from the conclusion that he should be dealt with the same as scab—vigorously.

The sheep industry has suffered unparalleled loss in this State the past year, due to the presence of the twisted stomach worm. The victims were principally lambs and yearlings. We are not yet in the possession of statistics, but have reason to believe that the loss will exceed 85,000 head. The fatality has been so unusually large that nearly all of the agricultural papers have commented upon the subject.



Half tone of intestine of a sheep, natural size. The modules show the presence of the modular disease. These lumps are filled with a greenish, brownish or yellowish cheesy or gritty matter.

The twisted stomach worm, or *Strongylus contortus*, is a common parasite of sheep, but only under favorable conditions does it occur in such numbers as to be productive of much harm. The life history of the parasite is not fully known, but

sufficient is known to indicate the necessary measures to be employed for its prevention. The parasite is an inhabitant of the fourth stomach, in which it comes to maturity and lays its eggs. The eggs are passed out of the intestines with the faeces and fall upon the pasture or in small pools of water. These are taken up by another sheep with food or drink. How long they will retain life outside of the body is not definitely known, but will depend largely upon the exposure to which they are subjected. If they fall upon dry pasture they would soon be destroyed by drying. If, however, they should fall upon damp pasture or in pools, they would retain their vitality for a number of days. The eggs pass from the host in large numbers during the latter part of June, during July and the early part of August. You all recall the unusual rainy weather which we had during this period, the fields were wet and the clouds shaded everything so that the conditions were perfect for retaining life outside the body until they could be taken up by some other animal while grazing. In ordinary years the disease is largely confined to sheep that graze on bottom lands. The disease also appears occasionally when too large a number of sheep are kept upon a pasture and keep the grass eaten closely. This seems to be due to the soiling with the excrement. It thus happens that a small worm, which is an ordinary parasite, occurring only in small numbers and producing little harm, may under favorable conditions be the cause of great loss.

The worm is an inhabitant of the fourth stomach, and is reddish or white, according as its intestine is full or empty of blood which it abstracts from the stomach wall. The worms are thread-like, the males being about half an inch long and rather thick, and the females are from half an inch to an inch in length and more slender than the males. If the sheep be killed and an autopsy made at once, they will nearly all have a pinkish hue, and when placed in water will wriggle in a very active manner. If, however, a post mortem is held some hours after death, they will appear whitish or colored by the stomach contents. In this state they resemble the contents of the stomach so closely that an inexperienced eye may fail to detect them. On several occasions, where holding autopsies, I have seen the owner mistake them for fibers of the grass or hay, when there were literally thousands present. They are not twisted as much as their name would indicate. The common name is derived from the scientific name, which means contorted, crooked or twisted. The scientific appellation has reference to an anatomical peculiarity of the uterus, and not to the shape of the parasite as a whole. The number of these worms that may be present in a single individual is enormous. I have washed the contents of the stomach on several occasions and obtained a heaping handful. The small phial which I have passed around contains two hundred and eighty-seven, taken from one square inch of stomach wall.

The symptoms of the disease are not distinguishable from other parasitic affections of the intestines. The development of the worm is rather slow, and it is probable that the animal is affected for a few weeks before the symptoms are manifested. The symptoms vary greatly, in some cases producing death almost before it is known that the animal is affected. This, however, is not the rule, for in most cases the animal ails from a couple of days to a few weeks before dying. There is a general lack of tone, straying behind the flock, diarrhoea, fever, loss of appetite

yellowness of the eyes, drooping ears, sometimes the formation of a watery sack between the jaws, stiffness, getting down, inability to rise, etc. Lambs suffer most and yearlings next; old sheep not very much.

Treatment. The treatment must proceed largely along the lines of prevention. A sheep is difficult to treat with medicine in any disease, as it gives up so readily. In troubles of this character, the medicines used to cause the expulsion of worms become so diluted before they reach the parasite that they do not act energetically, and, therefore, only a little is accomplished at a time. Before they have succeeded in relieving the trouble, unless treated early, our animal dies.

The treatment consists of grazing the sheep only on the high pastures during the latter part of June, July and August. If possible, they should be changed from one pasture to another, or alternated on two fields every few days. This gives opportunity for the sun to dry the eggs that fall with the droppings and thus lessen the chances of infection. In years, such as this has been, when the disease infests uplands, as well as lowlands, the frequent changing of pastures will be most beneficial.

Of the medicinal preparations, I believe we must again fall back upon turpentine as the most efficacious. Turpentine given in oil—giving one part of the former to six of the latter, at the rate of an ounce to the dose, given in the morning after a night's fast, repeated every day for three successive days, answers very well. The sheep should be kept up in a lot for three or four hours after the dose is given. This treatment should be administered to all the flock as soon as the presence of the parasite has been determined. The best way to administer the dose is to use a syringe holding just the right amount. The syringe should have a small flexible rubber tube about three inches long on the end; this is easily passed into the mouth and the dose discharged on the back part of the tongue. This method obviates the necessity of holding the sheep in an uncomfortable position, and is an easy way to administer the medicine.

Another remedy is to use powdered wormwood seed. The powder is mixed with salt at the ratio of one part of the former to eight of the latter. The sheep are salted in the ordinary way twice a week.

Fowler's Solution of Arsenic is recommended in the Government publications from Australia, to take the place of turpentine. The dose is eight to ten drops diluted in sufficient water or milk to give in a drench.

Equal parts turpentine, asafœtida and oil is a prescription which was sent to the station as acting in an efficient manner. This dose is given after a night's fast. It is repeated once a week for three weeks.

Dr. Detmer recommends tartar emetic, one pound dissolved in three gallons of water. One to three ounces of the solution is given at a dose, depending upon the size.

The following formula is taken from the U. S. Department of Agriculture Report on "Animal Parasites of Sheep":

"Salt, one bushel; air-slacked lime, one peck; sulphur, one gallon; pulverized rosin, two quarts; put in a trough with cover where sheep can have free access. When sheep become thoroughly infested with worms death is almost sure to follow, but the above, if kept before the sheep, will surely act as a preventive."

There are many other prescriptions, but these are probably as efficacious as any. A few doses of the preventive above, or wormwood seed given early in May, might possibly do much good in flocks known to be infected the previous year. Most is to be accomplished by careful husbandry to prevent the disease as far as possible.

Another disease, which manifests itself during the winter months, has become very troublesome in some localities. The disease is known as the nodular disease. It is produced by a parasite which enters the animal under conditions very similar to the twisted stomach worm, and at about the same season of the year. The disease is not manifested, however, until January, February or March. This parasite is *Oesophagostoma Columbianum* Cur. It is much smaller than the twisted stomach worm. During the winter it infests the intestinal wall, and while the sheep are on dry feed the small sack which it forms fills with earthy matter of a brownish, yellowish or greenish color, very cheesy like or gritty. These may occur by the hundreds along all the smaller intestines, or only over a small area. They cause weakness, attacks of indigestion, and sometimes diarrhoea. The sheep most likely to suffer are the ewes at from four weeks before to parturition. The animal eats until it gets down, lies on its side, commences to stretch its head back, and in a couple of days dies. The animal is too far gone before assistance can be offered. The parasite is imbedded in the intestinal wall and can not be acted upon by any medicine. Wethers and sheep only slightly affected usually do not do well, but do not get down. They often become very poor, but this condition is not detected unless they are handled. With the return of pasture the nodules disappear. Pasture as much as possible, feeding root crops, and the use of feeds other than an exclusive diet on corn fodder and corn will reduce the loss.

There are several other parasites of less importance affecting the sheep, but I feel that I have already taken all the time allotted to this paper.

DISCUSSION.

It was moved and seconded that a vote of thanks be tendered to Dr. Bitting for his talk. Motion carried.

Dr. Bolser, State Veterinarian, was present and spoke for a few minutes. He said:

"Our experience with the parasite has been the same as Dr. Bitting's. Of course they have had a great deal of it about Lafayette, more than they have had in a great many other parts of Indiana. A year ago, in our dry season, we had a number of cases in low, marshy lands. We were called to see cases in Allen County where there were as high as seven and eight lambs a day dying in flocks, but by removing them to higher pastures and moving them again in a few days, and giving them medicine, they soon recovered. The great thing is to move the pastures."

Mr. Bell. Dr. Bitting said the egg gets in the grass and the other sheep eat it. Where do the first sheep get the egg?

Dr. Bitting. It is a propagation of the parasitic world.

Mr. Binford. I would like to know about parasites in the head. My flocks have suffered more from that than any other disease.

Dr. Bitting. To remove grubs from the head is not an easy thing. In the spring and winter we have had a great many sheep die from this cause. These grubs during that time become full grown, and if there are more than two or three in the head they may produce such a diseased condition of the bone at the base of the brain as to produce fever and cause death. There are, unquestionably, a large number of the sheep affected with grub in the head that recover, but usually, when we have cases of grub in the head, they are pretty far gone before we can do anything with them. I can not handle them, I confess, with any degree of satisfaction. We can inject solutions of carbolic acid and things of that sort, but the best thing to do is to use preventive means. The system adopted on the western ranges and in England is to make a trough V shaped and with a board on top and holes in the board. Salt is placed in that trough and around the holes is smeared tar, so that when the sheep eat the salt they will usually get a certain amount of tar around the nose. The tar will prevent the fly from depositing its egg upon the nostril, for that is where the egg is deposited. It is hard to inject anything that will reach this trouble. Inhalation of tar will quiet the sheep, but as a success I confess that I don't know how to handle it. The preventive should be used in July, and should be kept up for six or seven weeks during the summer.

Meeting adjourned until 10 o'clock Wednesday morning.

SHOULD NEW BREEDS OF SHEEP BE RECOGNIZED AT THE FAIRS?

BY JAMES A. GUILLIAMS, FINCASTLE.

The most simple and complete answer to this question would be: Why not? Are we not living in an age of progression? Is not our beloved America, or our United States, foremost among the mighty powers on earth? And why? Because the American people have ever labored to advance our standard of science and progression and keep pace with the revolution of the world in its ever onward movements.

Show me a nation of people that has said: We have good enough, we want no better; we will stop advancing in the developments of new breeds and agricultural pursuits and hold on to what we have, and I will show you a nation that has retrograded back to dog soup and cannibalism.

Show me a breeder of sheep who says: My sheep are the best in the world; we want no better; we ought to cease originating and introducing new breeds, and I will show you a hide-bound, selfish man with no thoughts beyond his pocketbook.

It is the history of more than thirty centuries that when a nation stops progressing in animal industries and agricultural pursuits, she quickly returns to heathenism.

One hundred years ago the Spaniards of Spain had a little Merino sheep that clipped four or five pounds of fine wool. They said: "Now we have got the best sheep in the world, now we will pass a law making it a penalty of death to anyone who sells a sheep and lets it go out of Spain." These same Spaniards to-day, under the very shadow of our free American government, are trying with might and main to butcher little progressive Cuba.

But the Yankee got a few of the Spanish Merino sheep and in a few years they made such improvements on them that instead of shearing four or five pounds they sheared twenty five and thirty pounds of fine wool. And the Merino breeders of America could proudly boast of the grandest sheep on earth.

But the world moved on.

And in a few years the American people said: "We want less fine wool and more mutton, for we find mutton is good to eat." Then come the little Southdown, the Shropshires and other breeds of mutton sheep knocking at the doors of the fairs and said, let us in, we have got a wool and mutton sheep; we are up with the demands of the times. And consequently the mutton breeds cover the hills and valleys of our republic to-day.

And while the Shropshire breeders now boast of the strongest association on earth—they are on the top round of their ladder of fame.

And the world is moving on.

Suppose the State fairs should turn a deaf ear to all demands of new breeds of sheep and say, because we have got two or three good breeds we will not admit any more new breeds—how long would people attend our State fairs to look at sheep. Ninety-nine men and women out of every hundred who come to our State fairs do so for the purpose of seeing something new and learning something they never learned before.

The original idea of agricultural fairs was to encourage the production improvement and for the advancement of our live stock interest and agricultural pursuits. It is true our new developments are not always the best at first, but give them an equal chance and time will tell—for by no other way except the comparison of our different breeds of sheep at our fairs can we reach nearest perfection.

The Persians are noted for their fine dress and stylish manners. They are a soup eating people. They raise the fat tail sheep, because it makes the best soup in the world. Now, who will deny that the American people are not tending towards the Persians in dress and style, and, perhaps, in a quarter of a century our people may become a soup eating people. Then what? Why, there will be a demand for Tunis sheep and the broad tail breeds will predominate.

Then, we say, let the new breeds come in. Give them a place, for we know not what the demand will be in twenty-five years hence.

We must advance or retreat, for the world is moving on.

I have raised the Tunis sheep for three years. These sheep originated in the mountains of Tunis. We have sheep with tails that weigh from five to ten pounds. Some of you gentlemen talked about early lambs. We can have the lambs come at any month of the year we want. We frequently have them come in the middle of August, and from that on any time we like. They are beautiful little fellows, and stand more heat and cold than any other kind of lambs we have ever raised.

DISCUSSION.

Member. Is the meat of the tail considered a valuable part of the sheep?

Mr. Guilliams. We don't claim that as the principal part of our sheep, but the meat is between a fat and a lean meat. It is fatter than the rest of the sheep. In docking the lambs they bleed less than any other kind of sheep. The wool is good. We got the highest price for wool that was paid this year. We are improving the wool. We got our first sheep of this breed from South Carolina. They were the remnant of an old flock that were imported there years ago. After we kept them here a year on our feed and in our climate they averaged from six to ten pounds of wool.

Robert Mitchell, Princeton. Every man in exhibiting wants to remain in the exhibition, because it brings his stock before the people. I have gone to all the leading fairs, and I spent a good deal of time at the World's Fair, and I am speaking from experience when I say that the breeders will have to modify their classification. Breeders all want to see the fairs prosper. You will have to classify the sheep as mutton sheep, long-wool sheep and short-wool sheep. If the sheep men will get to work and give a broader classification it will be the best thing for the fairs that can be done.

Mr. Guilliams. Cut the premiums down until the fair can pay them. I am willing to take whatever the fair thinks they can give and pay it and do the fair justice.

Mr. Plumb. It seems to me that if there is a breed of sheep not so well known in Indiana, but if there is a prospect that it is going to have in the future a large development and will be recognized by other fair associations, it is proper that our fair association should recognize it if possible. It seems to me that it is taking a step backward if we recognize classes instead of breeds, because we have to recognize that breeds are distinct, and it has great bearing in regard to adaptability, feeding, etc. In some of our fairs I think there can be retrenchment in directions that tend away from agriculture. In Canada and England, where their fairs are immense successes, they do not have horse racing at all. Now, the question is, how we can benefit the interest of the stockmen and the farmers and not have so much of these outside things?

Mr. Mitchell. The American people are different from others. The effort of the fair managers now is how to get the crowd to attend the fairs. They look after the gate receipts, and the people are demanding something new all the time. The city press is continually calling for something that absolutely can not be done. I have made myself obnoxious for the last two years in fighting these shows.

Mr. Dungan. A county fair can not take the sheep industry of our country and classify it into eight or ten different classes; we have not the money to pay the premiums. I am satisfied if we would give less money to the racing and other things at our fairs, we would promote the interest of agriculture, but we must remember that we have a class of people in all our fairs that will give more money to races than anything else, and it is very difficult for any fair association to control these matters.

ADVICE TO BEGINNERS.

BY MORTIMER LEVERING, LAFAYETTE.

It is an old saying, "Advice is cheap"—and for the reason that it is given for the asking, and often without asking, may be the cause that so little advice is ever acted upon, or seldom heeded. There are many, however, who look back over failures, mistakes and misfortunes that could have been evaded had they been properly advised and had they acted upon it. It is the object of this talk to tell briefly to new beginners in sheep raising, in part, how to start in the enterprise, and point out a few of the vicissitudes they are likely to encounter and how best to remedy them.

Every man engaging in a business or industry comparatively new to him, or in location not familiar, and whose conditions are yet untried, should commence in a small way. The beginner without experience, or an experienced breeder starting in a new location can not be too cautious and patient. Sheep husbandry, when properly carried on, has been one of the most remunerative departments of farm industry, but some that have engaged in it have signally failed. Few things either in animal life will thrive when neglected, and more especially is this true of sheep. They must have attention and care. They have numerous foes without and within. Marauding dogs are their worst enemies, and forty parasites find their bodies an easy prey for destruction.

There is no other season of the year as advantageous a time as the mid-winter months in which to start a flock. Buy a few ewes that have been bred early in the fall to a good ram. The earlier they are bred the better, for the early spring lambs make larger and stronger sheep than late ones. It is best not to let the ram run with the ewes after November 20; this injures the lambs to come before April 20, as the time of parturition is 150 to 154 days. A January lamb is worth three April ones. When lambs are dropped in cold weather the breeder must see to it that the lamb does not get chilled or frozen to the ground before it is dry and able to stand. If possible put the ewe into a place where it is warm, or where the temperature is above freezing point; have the floor covered with dry leaves or chopped hay and straw. Do not have the pens bedded with loose straw several inches deep, as the ewe would be likely to step on the lamb and kill it—this very frequently happens when a ewe drops twins or triplets. Be careful not to have a deep, loose bedding; the bare ground is far preferable, and when the weather is warm the lambs will stand a far better chance if dropped on the bare ground. Should a young ewe disown her lamb, rub the lamb's head against the oiliest part of the mother's wool; the ewe recognizes her own lamb by smelling it. Should you want to give a ewe a foster lamb, do the same way, or rub her own lamb all over the foster lamb, put them in a small pen or lot, and bring a dog as near as possible and make the dog bark.

Do not have your breeding ewes too fat before they lamb. After the lambs come, then give the mother ewes extra food and care. The best food for them is clover hay that has been put up carefully and kept in mows or under cover, together with bran, and ground or whole oats mixed with a little oil meal. If you have mangel-wurzels, sugar beets or turnips, cut them up into small pieces, shape of a finger, and mix with bran. Give a food of this kind at night. Feed the mother ewes all they can consume before leaving the trough. If any food is left, take it away and regulate the amount of subsequent feeds accordingly. Be sure to cut away all the long or shaggy wool from around the flanks and udder. This should be especially observed in the long wool breeds of sheep, as many lambs are so weak they become discouraged and exhausted in trying to find milk, which in many instances is next to impossible for the new lamb to discover. Should you wish to raise the lamb "on the bottle," use an ordinary nursing bottle and rubber nipple. Use sweet milk; add an equal part of warm water. Should the lamb scour, scald the milk and add a little sugar and baked flour. If you keep your ewes in small pens, provide the lambs with a place to get under, to guard against the ewe lying down on them. A good plan for this purpose is to drive four stakes in the ground; leave standing out about fifteen inches. Nail a board about a foot wide on the top of these. Put it on the side of the pen. The lamb will go under this for protection before it is two days old. When the lambs are three days old cut off their tails three-fourths of an inch from the body. Also castrate at this time such lambs as you wish to make into wethers. Provide a "creep" for your lambs in the pasture or lot. Make it about 12x15 feet for a small flock, with openings just large enough for the lambs to go through but too small to admit the ewes. Keep in this pen feed, bran and ground oats mixed, and a rack of clover hay. Keep a supply where the lambs may have access to it at all times. Should you want to fatten your sheep or fit early lambs for market, remember that it is not the quantity of feed, altogether, that insures success in fattening, but it is frequent feeding and absolute quiet for the sheep and lambs. If you would have the best results, feed every three hours day and night. One feed at 10 o'clock at night and one at 4 in the morning, during hot weather, is worth four times as much as the same rations fed at 8 and noon during the day. It takes a vast amount of strength and fat-producing elements to fight flies and pant all day in the hot sun. Provide your sheep some kind of shade, the lower the better, so they can barely walk under; but keep the sides open for currents of air. Every observant person has noticed that sheep and lambs will crowd under the bed of a standing wagon, and prefer it to any sheds, barns or trees to which they may have equal access. A good plan is to select the highest and most exposed part of a field, drive stakes into the ground, leaving them about thirty inches high, and cover them with a flat roof of boards. For 100 sheep such a roof should be about 6 feet wide and 36 feet long. When the gad fly, the larva of the grub worm, buzzes around the sheep's head endeavoring to deposit the egg in its nostril, the sheep will put its head down close to the ground and scurry to get under shelter. With very little care and protection a flock should never be affected with "grub-in-the-head," which is a difficult matter to eradicate. The best treatment is to mix one part of turpentine with two parts of lard oil, hold the sheep's head up and pour a half

tinful into each nostril. After two hours blow a little Scotch snuff into its nostrils with an ordinary insect blower, that may be purchased for 10 cents at any drug store. The turpentine penetrates the membranes of the head and the grub loosens its hold temporarily; the snuff makes the sheep sneeze violently and some of the grub are ejected and displaced. This treatment should be repeated three or four times at intervals of four days.

When the summer is well advanced and the lambs begin to eat grass the flocks are infected with the most prevalent and destructive disease. It is found more commonly in low or wet pastures than on high or dry ones. It is "Strongylus Contortis," or "twisted stomach worm." It is very fatal both to lambs and old sheep, but more particularly to lambs. When a flock of lambs have this infection it will destroy every one unless they have remedial relief. When a lamb is taken with these pests it will scour, and when the flocks move from place to place this lamb will move more slowly than the rest; it lags behind, walks stiffly and seems lazy. Sometimes the lips swell and the throat enlarges, like goitre. As the trouble advances the lamb will fairly shrivel up, so fast does it lose its flesh and strength. Finally it lays flat on its side, froths at the mouth, and dies. These worms may be found in the third and fourth stomachs. They are as fine as thread, about one and a half inches long, dark brown when alive, white when dead. They mat together in hundreds, and resemble fine-cut tobacco. These worms take up the animal's blood just as it is ready to go into circulation. Before the lamb dies it seems to have no blood left, and what it has is like brick-dust mixed with water. To eject these worms is sometimes a difficult matter. Do not use turpentine as an antidote, it will not reach them. Worm powder, containing santomine, worm-wood and tincture of iron, is the best remedy. But if your sheep are healthy do not feed worm powder mixed with their salt at all times as a preventive. In this case it will not act as a preventive, and when your flock is infested with the worms the sheep have taken the worm powder so long that their stomachs assimilate it as a food, and it is no longer a vermifuge. When you suspect that your flock is infested take them off the old pastures, put them on dry feed and give plenty of the worm powder, either in salt or feed, the latter may be more effective; when your sheep are safely well again stop feeding worm powder. But always keep salt where they can get it at all times. Should your sheep cough frequently you may suspect they have "hoose" or "husk"; this is caused by worms that attach themselves to the bronchial tubes and lungs. For this trouble put your flock into a lot and keep them from water forty-eight hours, then mix quick-lime into some pure water until it looks like skim milk, add an ounce of sulphur to the gallon, put this into buckets or troughs and let the sheep drink all they will of it. See that your sheep are kept free from the contagion of "scab" and "foot-rot." These, with the few diseases mentioned before, are the chief troubles that flocks must be guarded against. One of the ways for a beginner to become acquainted with the business at small risk of loss is to breed for mutton. High grades, say half or three-quarters of the best breeds, will sell best and show plainly the best advantages these possess over scrubs. We should recommend beginners to start with registered sheep of some of the more popular varieties of the day. For the reason that they are more responsive to care and feed, attain an earlier maturity, yield more wool, command

a higher price for mutton, and far greater selling value to breeders and stock raisers. They have a uniformity that is attractive, and as "blood will tell" in a thousand advantageous ways the breeder gets a better profit, and their association and presence is a great delight and interest to the owner.

DISCUSSION.

Mr. Binford. A farmer told me that he put his sheep in a small tight shed and distributed a bushel of slaked lime, and then got out. He said such sneezing and running about he had never seen, but he found afterward a number of the grubs on the floor, and no more of the flock died.

Mr. Mitchell. Do you think it necessary, Mr. Levering, to have the lambs castrated if you are going to sell them to butchers?

Mr. Levering. I don't advise the general wethering of lambs. I do approve docking of the lambs, for they sell for fifty cents a head higher in the Eastern markets when they are docked. For raising lambs for market I would not advise castrating. If I would recommend one thing above another for the benefit of the flock, I would advise putting slaked lime over the floors of the shed as the best thing in the world. It is the finest thing in the world for sheep, for the condition of their lungs and all that sort of thing. You must have a dry shed to put them in.

Mr. Dungan. Is it not a fact that stock buyers invariably make it an excuse for not paying as much as they otherwise would if a lamb is not castrated?

Mr. Levering. Not unless the lamb is four or five months old. It is safe to castrate at three days old, but if the market does not suit you and you let them run the shippers will not pay as much for them. If you keep the lambs for yearlings it will cut the price in two.

Mr. Binford. I always have the lambs castrated, but never under a week nor over four weeks. It is a great loss if you carry any of them over that are not castrated. Those who take good care of the lambs and sell them early sell them better if they are not castrated; but where we are not sure of being able to get them to the market early they should be castrated.

J. M. Harshbarger, Ladoga. I think the sheep is the most profitable animal you can handle, if you start right. I will give reasons for thinking so. I would first buy a lot of good grade ewes. Then I want my lambs to commence to come about April 20th. I let the ewes run on blue grass pasture and timothy and clover fields all the year round, excepting the six weeks of the lambing season. Don't buy cheap ewes; they are dear at any price. Don't get a ewe under two years old. I have had ewes to breed me ten pair of twin lambs. I paid \$20 for the sire of those lambs. Two years afterwards I sold twenty ewes for \$8.00 a piece. I would take the very best stock I could get. No matter about the breed, get whatever breed you fancy, but get good stock. I don't allow my sheep to breed until they are two years old, and then get good, strong lambs. I sold my wether lambs a month ago, and they averaged ninety pounds. Another thing is to have proper quarters for them. Don't let them be crowded, or the lambs will come dead. I do not call the lamb and the fleece all the profit. Sheep are good to clean the farm

and keep it clean. If we could school our farmers up to eat mutton, we could have fresh meat for ourselves all summer. I give my renters lambs to raise in their yards, so that their dogs may get used to them, and I have never lost a sheep by the dogs in fifteen years.

Mr. Cowgill. The experience of my friend, who is addressing you, so completely accords with my own fifty years' experience, that I don't find one solitary thing to controvert in what he has said. If you will all follow the advice he has given you, you will be successful sheep raisers.

Mr. Dungan. I have been breeding registered sheep for a number of years. Some years ago I went over into Morgan County and bought a hundred head of stock sheep. They were from four to eight years old. I bred them for four years successfully. I sold them at a sale after that time. The gentleman who bought them bred them, I think, for three years, and he sold them, and I don't know but they are breeding yet. It is a very false idea to think that after a ewe is over five or six years old, that she is useless. My experience is that it pays to buy ewes that have been bred, when we are buying ewes for profit.

Resolution offered by I. N. Cotton:

Resolved, That the Indiana wool growers hold their twenty-third annual meeting, 1898, commencing on the evening of the first Tuesday after the first Monday in January, at 7:30 P. M., and on the forenoon of the day following.

The resolution prevailed.

SHOULD IMPORTED SHEEP BE SHOWN AGAINST HOME BRED ONES?

BY URIAH PRIVETT, GREENSBURG, IND.

I think not, or at least until they have been imported one year or else fitted on this side of the water after being imported.

In the first place, we have not the climate to grow and fit sheep in like they have in England and Scotland. We can not grow the different varieties of feed and we do not feel like putting up twenty or twenty-five ewe lambs to feed for the show ring when we know we can not beat the imported ones, and at the same time it injures their breeding qualities, breaks them down two or three years before it will one that has not been fitted for the shows. The lambs that are imported are from three to four months older than ours, and it is also the same way in their yearling ewes as well as their rams, and you will readily see that they have a big advantage over us. We can not get our sheep to breed as early here as they can in the old country. And then, again, we have several breeders whose means are limited, and they can not have so many lambs to put up and feed for the show ring, consequently they do not feed anything, just because the imported sheep are in the way.

In England and Scotland they will pick out twenty or twenty-five lambs and put them up to feed for the show ring, and when one goes wrong or does not develop as they thought it would, they throw it out and keep it up till show time,

when they will probably have not over five or six left out of the twenty or twenty-five, and you can readily see the advantage they have over us, both in age and number.

Some one would probably say, "Why not we put up twenty or twenty-five?"

Well, the reason is just this, they put them off to the butcher at a long price, and you see they have not lost anything by feeding them.

In the second place, we are not as good shepherds and never will be as long as we have to feed and show against importers, speculators, capitalists and monopolies.

Again, you show me a man that has made any money worth naming by importing sheep into this country and selling them and I will show you ten that have lost money by speculating on them. Capitalists and speculators will go across the waters and import sheep just to monopolize our shows with. I would like for you to show me the advantage they are to our country or fairs either. I have been looking for two years to buy a Southdown ram that was imported, to head my flock of Southdowns with, and have failed to find one yet. This goes to show that some of them do not care whether he is a good stock ram or not, just so they can win the ribbons with him.

So, you see, it is not encouraging for us to feed sheep twelve months and then have to go to the fairs and there find a lot of imported sheep just across the water, that have been fed in a better climate by experienced shepherds, and bought for the sole purpose to down us breeders with, just because a good many of them can not fit sheep for the show ring. So, you see, money monopolizes the whole show. Now, if you expect us to educate ourselves as shepherds, you will have to bar imported sheep out, and then we that raise fine sheep will have some encouragement, and there will be new flocks started and there will be more interest taken in sheep husbandry, and there would be some interest taken in fitting sheep for the show ring; for there would be no monopolizing the shows, with capitalists going across the water and buying some one else's experience. And, at the same time, the small breeders would attend our State fairs and get a share of the ribbons, and advertise their flocks, and, in a few years, you would see our sheep pavilion out on the fair grounds running over with sheep. I saw at one little fair, this fall, over one hundred and sixty sheep. It was because they knew they would not have to go against imported sheep.

Mr. Cotton. I think Mr. Privet is right. It is almost impossible for any man in this country to prepare his sheep for the show ring as the imported ones are prepared. It is not so much in the quality of the sheep as it is the expert who trims and prepares his sheep for the ring. I don't believe in this trimming and shaping, but bring them just as they are, and then when a man buys he knows what he is getting. A man who wants to start in the sheep business is taken with them and thinks they are the prettiest things he ever saw in his life. They are not the best for breeding. After the fleece is taken off you would not know the sheep. I have examined sheep at several fairs that were shaped in that way. Right on the fore shoulder the fleece would be trimmed to 1½ inches and behind the fore shoulder it would be 2½ inches long. That is not the kind of sheep you

want to breed from. Until you do protect home industries you are going to have trouble on your hands with the sheep men.

Mr. Guthrie. If the Englishmen can fit sheep so much better for the show ring, it is also true that they fit all their sheep better. Why is this? We certainly have got advantages here.

Mr. Mitchell. They have practical shepherds there. Most of their flocks are under the care of shepherds who make this their business. When I want to buy a sheep for breeding I would not take a show ring animal, but would go to the man who owned that sheep and get a far better animal than the one shaped for the show ring. I think it is all right to fit for the show ring. I don't believe, though, that we can't breed as good sheep here as they do over the water.

Mr. Guthrie. They breed one breed of sheep there right along.

THE DIGNITY OF SHEEP BREEDING.

BY PROF. BELL.

When Horace Mann, the great educator, after having been President of the Massachusetts Senate, was offered the Secretaryship of the State Board of Education his friends tried to dissuade him from its acceptance, on the ground that it was a mere secretaryship, without dignity or honor attached to it.

His answer was: "If the office is not honorable it will be my duty to make it so. I would have the office debtor to me than to be debtor to the office."

When a calling is honorable or dishonorable depends upon the character of the men engaged in it. Honorable men always make their work honorable. All necessary work is honorable, but some kind of work ranks higher than other kinds, because of their relation to society.

What calling is most honorable, which contributes most to the welfare of mankind? Outside those vocations that have for their direct purpose the teaching of right living, no other great industry ranks equal to that of sheep culture in its opportunities for serving man.

Man's indispensable need is food, and this unrequested demand continues until the end of life.

His next greatest necessity is clothing. He must be protected from the cold or he dies, and this need in this climate is mending. The sheep better than any other animal supplies these two of man's greatest needs.

One can scarcely realize, even when his attention is called to the facts, the extent to which wool is used—the millions upon millions of woollen garments that each year contribute to the comfort, health and longevity of almost every man, woman and child in the civilized world.

An industry that contributes to the happiness of millions of people, as no other industry does or can, must be honorable when pursued in an honorable way.

That mutton is a healthful and palatable food has been attested in all ages. Year by year it is more appreciated and more and more used; and the time is not far in the future when mutton will hold the place of honor as a flesh food. Thus we see that while the man engaged in sheep culture is raising the best sheep possible and doing the best thing for himself, he is at the same time engaged in supplying the two greatest and most pressing needs of his fellow men.

This makes him and his work respected. The shepherd and his sheep from the earliest times have been symbols of honor and innocence. The "wolf in sheep's clothing" and the "Good Shepherd" are Bible symbols familiar to all. What other calling among the various lines of manual industries could furnish a title for the Man of Galilee—"I am the Good Shepherd and know my sheep."

Not only the character of the men and the quality of work done determine the dignity of a calling, but also the magnitude of the work and the number of people engaged in it.

The number of sheep in the United States is about 37,000,000, and the annual clip is about 300,000,000 pounds of wool.

To breed and raise these sheep and produce this wool gives profitable employment to many thousands of men.

Then the manufacture of this raw material requires more than 2,000 factories, with an invested capital of more than \$100,000,000, and there are employed in these factories more than 50,000 men and nearly as many more women and children. The wages paid annually to these employes amounts to over \$30,000,000.

Now, when you reflect that the United States does not produce *one-half* the wool it uses, and that the number of people in other countries engaged in sheep raising and wool manufacture vastly outnumber those in this country, we can begin to form some slight estimate of this world-wide business.

Sheep culture is a business that directly and indirectly reaches and affects the millions, and yet it is honorable in its every stage.

It is a noticeable fact that only the better class of farmers engage in sheep culture, while it is also a noticeable fact that it is the "scalawag" farmers that harbor the miserable curs that kill more than 30,000 sheep every year in this little State of Indiana alone.

"Dog on" the man that keeps a sheep-killing dog.

The sheep furnishes food for the hungry, clothing for the naked, employment for the idle, and is an important factor in supplying the wants of man, and thus it is the flock-master becomes a public benefactor.

DISCUSSION.

N. H. Jones. I have learned in the fifteen years I have been a member of this Association some very valuable things. There used to be an old gentleman here and I learned some very valuable things from him about killing dogs, and I am surprised to learn from the papers and discussion here of the number of sheep killed by dogs in Indiana. It is easy to get around it. We have a man in our county who makes it a positive rule not to let a dog bark in hearing of his house.

Now that is rather sweeping; may be he goes a little too far, but there are no sheep killed there. Well, this old gentlemen told me to go to any druggist and get ten grains of strychnine and make it into five doses and it is an easy matter to get it where the dogs will be made away with. No honorable man would put anything in the way of a man's dog at home, but whenever a dog makes tracks along past your place at night, lay for him.

Mr. Binnell. I once had fourteen sheep out of a flock killed and got pay for them from the Township Trustee. My man told me that within thirty-six hours there were twenty-one lambs dropped dead, and a number of wounded sheep died afterwards. These, of course, I got no pay for. They kept on that way a few days until half of the lambs in the flock were premature and dead, and I lost half my flock. That is my experience. I am a lawyer and do not tend to my sheep myself, but I told my men to kill every dog that came on the place. I am responsible, and they do it. I have never had a single lawsuit about that. You have a right to shoot a stray dog on your place. I tell my men to shoot the dogs, and I will defend them.

HOW OLD SHOULD SHEEP BE KEPT FOR BREEDING?

BY HIRAM FOSTER.

Mr. President and Members of the Indiana Wool Growers' Association:

The subject assigned me for this occasion, viz., "How Old Should Sheep be Kept for Breeding?" is one that is of material interest to those of us who keep any great number of sheep; especially when the sheep and wool interests are at their zenith, as we hope to see them soon.

The age to begin breeding ewes, we think, is implied in this question, as well as the age when they should be fitted for market.

Experience has taught us that ewes should be bred to drop their first lamb when twenty-three to twenty-five months old. At this age, they should be properly matured in size.

The flock may be kept to a uniform size, etc (as it is an exception when a ewe develops much growth after nursing her first offspring).

We would breed for five years in succession and not longer, unless lambs were worth more than ewes.

In the usual routine of sheep breeding, we think at the age from seven to eight years is the proper time when the ewes should be fitted for market.

At this age, or even younger, the teeth become few and far between. The tissues break down rapidly, and the assimilation of food more imperfect, rendering it very difficult to fit for any respectable market after having nursed the fourth or fifth lamb.

Some may claim that a ewe will raise a good lamb each year for a longer time than above. This we concede; but do not consider it good business to keep

an animal until its period of usefulness has passed. When we do this the animal becomes worthless for us, and we would soon learn that prospective buyers would view the matter in the same light.

Then if we would make the most out of our flocks, cull the ewes out which are near seven (7) years old.

We will find that we can make respectful store sheep out of them by the proper application of the right kind of food.

REPORT OF TREASURER, JANUARY 5, 1897.

Balance in treasury, 1896	\$7 69
Received from dues, 1896	12 05
Total	<u>\$19 14</u>
Disbursements	13 33
Cash on hand	<u>\$5 81</u>

JOHN L. THOMPSON,
Treasurer.

PROGRAM FOR TWENTY-THIRD ANNUAL MEETING OF THE INDIANA WOOL GROWERS' ASSOCIATION.

1. President's address.
2. Report of Officers.
3. Methods of a Breeding Association . . . Mortimer Levering, Lafayette.
4. What is the wool market demanding at the present time?
H. H. Keim, Laporte.
5. What is the special influence of food on the carcass?
Prof. C. H. Plumb, Lafayette.
6. Rape for sheep pastures in Indiana . . . Marion Williams, Muncie.
7. Handling lamb wethers for the market . . . Henry Leaming, Romney.
8. Resolved, that Indiana wool growers should hold their annual meetings
at different places in the State.
Affirmative, Thomas Bowles. Negative, C. A. Howland.
9. Methods of advertising pure bred sheep . . . Sid Conger, Flat Rock.
10. Sheep shearing machinery, its advantages.
H. S. K. Bartholomew, Middleburg, Ind.
11. Address by Hon. J. A. Mount, Governor.
12. Shepherds' Medicine Chest . . . State Veterinarian.

Twentieth Annual Convention of the Indiana Swine Breeders' Association.

The twentieth annual meeting of the Indiana Swine Breeders' Association was called to order in Agricultural Rooms of the State House, at 2 P. M., January 6, 1897, by President Adam F. May.

Minutes of previous meeting read and approved.

Treasurer I. N. Barker made his report showing a balance on hand of \$37.45, and in consideration of this being almost sufficient funds it was decided to remit the dues for 1897 to all members who had paid up until that time. Books were then opened to enroll new members, and fourteen new and three delinquent paid up, making a total of sixty-four members. There were many in attendance.

PRESIDENT'S ADDRESS.

Gentlemen and Brother Breeders:

Before attempting to address you, allow me to tender you my sincere thanks for the high honor you have conferred upon me in electing me to preside over this meeting. It is with pleasure that I am permitted to greet you, at this the twentieth annual convention of the Swine Breeders' Association of Indiana. We are assembled together to mark the close of another year, as well as to welcome the beginning of a new year in the swine industry. We can truly be thankful for the prosperity that has attended our industry during the past few years. While most all other industries have been running at low tide, and suffering many inconveniences, we, the Swine Breeders, have been able to ride above the waves of depression and are to-day sailing on a quiet sea with just enough breeze to show us that there is another prosperous year ahead of us. While some of us, because of disease in our herds, have not reached the mark we aimed at in the beginning of the year, yet many others have even passed it. I would do injustice to my convictions as well as to your comprehension of the extensive interest this Association represents and seeks to promote, if I were to insinuate that personal gain were the highest motives that prompts our actions. It would be an injustice to your intelligence and character, as citizens of the great State of Indiana, to intimate that you are not prompted by those higher motives which comprehend the welfare of our State, and the advancement and prosperity of its people. Therefore, in the discussion of our

individual interest, we are discussing the interest of the people of Indiana, and when we talk of the interest of this State, it includes the interest of every other State. Then from this it is to be hoped that our coming together will extend further than simply the benefits and pleasures of the social hour. Something should be involved here that will be of such importance, that will carry it home with us, and reduce it to practice, in the care and management of our individual herds, and thus extend the benefits of our meeting throughout the entire State. The year just past has been one of the most destructive to the swine industry, on account of swine plague, or hog cholera, that we have had for many years. Not only has this been the case in Indiana, but in other States as well. And again, it has been clearly demonstrated to us, that the average farmer has suffered a heavier per cent. of loss than the breeder, thereby proving to us that care and attention are two necessary elements to the welfare of our herds. And again, it is clearly proven that the farmers, themselves, are very largely to blame for the spread of this disease. A great many are slow to believe in either swine plague or hog cholera, till a goodly portion of, or the entire herd, has become inoculated, then finding this to be the case, the herd is hustled off for the market, and in many instances, are driven along the public highways, scattering disease like chaff before the wind, and here they are sold to the packers, to be again sold to the innocent, unconscious consumer. Now, this in my judgment is a great cause for the prevailing low price of hogs this winter, and instead of over production, it is under consumption that causes low prices in years when there is so much disease scattered all over the country. When this is the case, consumers are afraid to eat pork, and is it to be wondered at when almost daily we see infected herds driven to our markets? Foreign countries refuse to buy our export hog products on this account, and they are not alone, for to my knowledge even our local butchers, early this fall, could scarcely find a sale for pork at all. Now, to the best of my knowledge, up to the present time there has not been found any cure or preventive for this dreadful disease. We have the Haas, the Cutsinger, the Cole, the National and hundreds of other remedies, and yet I can not say that any of them have proven an entire success. At last the famous remedy by inoculation comes to our rescue, but as I have never tried it, I can not speak for or against its merits, though I have understood it not to be a success, and this from parties who have used it. But we are fortunate enough at this meeting to have on the program some reliable breeders who have tried this remedy, and I trust that through them we may be able to learn of its wonderful effects. Now, as stated above, I feel as yet we have failed to find a remedy for this dreadful disease, and as a consequence it remains for the breeders of improved swine all over the country to take this in their hands and do our utmost to stamp it entirely out of existence. I believe this can eventually be done, yet it will take heroic measures to do so. Methods for this purpose should be discussed at all swine breeders' meetings, and all breeders of improved swine should do all in their power to stay its progress. But above all let me urge upon you the necessity of legislation on this point. Let me, as a brother breeder, urge you to do all in your power to get our Legislature to give us a law prohibiting the sale of or transportation of diseased hogs along our public highways or railroads, and to

provide a heavy penalty for those guilty of such offense. Also to make it compulsory for any one losing hogs by swine plague or hog cholera to burn same within a few hours after death, instead of leaving them lie around for weeks and even months, as is now the case. Would also urge that a penalty be provided for any one guilty of this offense, and then, when this has been accomplished, we as breeders will have but little to fear so far as swine disease is concerned. And I believe if we were to urge the passage of such a law by our Representatives, and to then see to it that such a law was strictly enforced, that it would only be a question of time till we could enjoy its effects. Let me say, however, that we as swine breeders have long ere this learned to take the bitter with the sweet, and with all the bitterness of the past year, any of us as breeders can look back only a very short time, and at some time during our short career as a breeder, recall incidents that bring to our mind the fondest of recollections. And again looking to the future, I see no reason why the year of 1897, with our immense corn crop and the general shortage of breeding animals, with the great territory of the south coming to us for our improved swine, I see no reason why the future does not contain happiness and prosperity for those interested in the breeding of thoroughbred swine.

In answer to the call for report of committees, Judge Martindale, chairman of Committee on Legislation, said that the committee (S. M. Shepard, Professor Bitting and himself), after a careful consideration, prepared a bill which they tendered several leading breeders, who concurred in the opinion that, in its general features, it was a bill of great value to the swine industry of the State if it is made a law and enforced. He said that the endorsement of this Association was necessary to insure the passage of the bill, and that members should carefully note the reading of each section and make whatever suggestion and changes that, in their opinion, might be of benefit. It was to be entitled, "An act to prevent the spread of contagious diseases among swine," and is as follows:

AN ACT entitled "An act to prevent the spread of contagious diseases among swine, defining the duties of railroad companies, stockyard associations, the managers of fair grounds, and individuals in relation thereto, defining certain misdemeanors for making this act effective, fixing certain penalties for the violation thereof, and declaring an emergency."

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana*, That it shall be the duty of all railroad companies and all stockyard associations operating in the State to thoroughly cleanse and disinfect all cars in which hogs are shipped to their yards, immediately after unloading the hogs from the cars, and to keep their pens in which hogs are kept thoroughly cleansed and disinfected. And it shall be the duty of the managers of all fair grounds in the State, where swine are placed on exhibition, to thoroughly cleanse and disinfect, and to keep cleansed and disinfected, all the pens in which swine are kept, and all crates in which swine are brought to such fair shall be cleansed and disinfected immediately upon their being received at the fair grounds. And it shall be the duty of the managers of such fairs, before receiving any swine into such pens, to require and take from the proposed exhibitor an affidavit that the swine presented for exhibition have not,

within the two months last past, been exposed to any swine disease, and that he did, before shipping such swine, wash the same with a solution containing not less than one-tenth of pure carbolic acid, and that the car in which such swine were shipped was thoroughly cleansed and disinfected before said swine were loaded in it.

SEC. 2. That it shall be unlawful for any person to drive upon any public highway, or suffer to run at large, or to ship in any vehicle or railroad car, any swine knowing the same to be infected with any disease; but the breeder or owner of any herd of swine which becomes infected with any disease, may, within five days after the first indication that such herd is so infected, separate and ship and market all well and healthy hogs from such herd, and it shall be the duty of all breeders and owners of hogs in this State which die with any disease, to burn each carcass to ashes within ten hours after death.

SEC. 3. It shall be unlawful for any person owning or controlling swine, knowing the same to be infected with disease, to allow such swine to have access to any stream of running water in this State, so that the water in such running stream to which such diseased swine have had access, may flow down through the lands of others from where such infected herd is kept.

SEC. 4. That any manager of any railroad company or the manager of any stock yards, operating in this State, who shall fail or refuse to cleanse and disinfect the cars at such yards, or fail to keep their pens cleansed and disinfected as required by this act, and any managers of fair grounds who shall fail or refuse to cleanse and disinfect their pens or crates and require from the exhibitor the affidavit required in this act, and any person who drives upon any public highway or suffers to run at large, or ship in any vehicle or railroad car any swine, knowing the same to be infected with disease, and any breeder or owner of any herd of swine which becomes infected with any disease, who shall, after five days from the time he discovers said herd is so infected, shall ship and market hogs from such diseased herd, or shall fail or refuse to burn the carcasses of hogs in such herd dying from disease as provided in this act. If any owner or owners of any such hogs or shoats so dying with disease, or any person or persons having the care or custody thereof, having knowledge of the fact ten hours, or upon receiving notice thereof ten hours, shall fail, neglect or refuse to comply with the provisions of the preceding section, it shall be lawful for any person or persons to enter upon the premises, after notifying the owner of the same, where the carcass or carcasses of any hog or shoat may be, and burn such carcass or carcasses, committing no unnecessary damage, and for each carcass so burned, he, she or they may recover the sum of one dollar for each carcass so burned, in a civil action before any Justice of the Peace of the township where the defendant or one of the defendants resides, from the owner or owners of any such hog or shoat, or from any person or persons having the care and custody thereof. And any person who shall allow swine infected with any disease to have access to any stream of running water on his premises, then he, or they, or any other person or persons who shall violate any of the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction before any court having criminal jurisdiction shall be fined in any sum not less than twenty-five dollars and not more than five hundred dollars.

SEC. 5. Whereas an emergency exists for the immediate taking effect of this act, therefore the same shall take effect and be in force from and after its passage.

DISCUSSION.

Mr. Collins. Do you not think that a fine of \$25.00 is too high? One would hesitate to inform against a neighbor when they know he has violated the law, knowing that the fine and costs would amount to the sum represented by this bill. The fine is all right for railroads and corporations, they can afford it, but for farmers it is too high. Ten dollars would be enough.

Mr. Martindale. The penalty must be equal; you can not regulate it according to the financial standing of those liable to it under the law. If it was \$10,00, large corporations could afford to disobey the law and pay the penalty. As to farmers, if they willfully break a law of this character, thereby jeopardizing such a great industry, they should be made to pay a heavy penalty. But the committee simply suggested the amount, and was willing to abide by whatever this Association agreed upon. It is not a matter of penalty, but the value of the bill depends upon its execution.

I. N. Barker. I do not think the penalty too high. If a neighbor disobeys or breaks the law, and we know it, we would point out his negligence, and inform him what was right, before any action was taken. If he then persisted in ignoring the law, he should be given the full penalty.

H. Oilar. Do you not think that this bill will have a tendency to make farmers keep the matter of cholera a secret, especially where such a high penalty follows proof of disobedience to the law? I think all should be made to put up a sign on their barn or gate-post when they have cholera, same as is done for contagious diseases of the human family. They should be compelled to warn people.

I. J. Smith. How about dogs, vultures, buzzards, etc.?

Mr. Oilar. Shoot them.

Mr. La Grange. There is a heavy fine against killing buzzards in this State.

The Association concluded that the penalty fixed by the committee, viz., twenty-five to five hundred dollars, was not too high.

J. Cunningham. It is my opinion that the clause regulating the time that hogs must be confined on the farm, after having had cholera, before they can be shown, is too long, and will be hard on showmen.

Mr. Martindale. That is a question to be decided by this meeting. You gentlemen having experience in these matters are competent judges and should fix upon the shortest time in which actual safety is assured.

Mr. Mustard. I believe that sixty days would be long enough. At least I would not hesitate to take hogs from a herd having had cholera, sixty days after the disease had disappeared, that is, from the herd of an experienced breeder, one taking proper sanitary measures to kill all the germs, etc.

Mr. Cunningham. I think myself, sixty days will be long enough.

Mr. Barker. I am satisfied that I could make my herd safe in sixty days, but am willing to abide by the provisions of the bill, whether it be ninety days or more.

Mr. Mitchell. I would like to ask who is to decide when the hogs have the cholera. Will not every farmer say that his hogs have some other disease, and rush them off to market?

Mr. Martindale. Last year when the old bill, in which Mr. Mitchell was interested, was presented to this Association and was disposed of by a refusal to submit their hogs to its provisions, I doubted the wisdom of the action, but I am now firmly convinced that swine breeders did the right thing. The old bill gives a veterinary the right to do as he pleases. He can visit the herd and slay the whole bunch or a few. This new bill includes all contagious diseases. If a man violates it, his neighbor or some one interested in preventing the spread of disease finds it out, he is informed upon and the evidence presented will convict him or not, depending upon its truthfulness. No traveling expenses of a veterinary or other expenses are included in this bill. The Association decided that the time necessary for safe disinfection of the herd be changed from ninety to sixty days.

Mr. Hobbs. The bill provides for a disinfectant consisting of one fifth part of pure carbolic-acid. In my judgment, considering experiments in that line, I would consider that entirely too strong.

Mr. Cunningham. In my opinion, the breeder himself should be a judge of the strength of the disinfectant. We should know what proportions to use and what strength we are using.

Mr. Mustard. In my judgment, one pint of carbolic acid to a barrel of water is sufficient.

The Association agreed that one-tenth part carbolic acid was about right and the bill was so changed.

Mr. Harcourt. Referring to the clause regarding the sale of hogs, are we compelled to sell our herds after five days?

Mr. Martindale. No. The bill provides that within five days after first noticing that your hogs are sick, you may take those that appear healthy and place them on the market, but after that time he is not allowed to take any hogs off his farm.

In the absence of those on program assigned subjects one, two and three, subject number four, "What Weight Can You Make a Pig Weigh at Six and Twelve Months Old," was taken up.

Mr. Mugg. I have not given this subject much thought, as I do not raise pigs to feed out, but entirely for breeding purposes. I believe that this subject should be presented by feeders. I never have experimented to see what weights I could make, but have made them weigh 500 pounds at twelve months. I believe such weight to be injurious to the breeding qualities.

Mr. Mustard. My experience is like Mugg's, while I have had some experience in feeding, I have not made any special effort to make these big weights. It is my opinion that to get any benefit from this subject one must give the entire process of making these pounds and that would take you through the entire course of management, for to produce strong, vigorous pigs, able to make these pounds and stand the strain, one must commence with the sow. She must be carefully bred to produce constitution, maturing and feeding qualities. Then every effort of the breeder must be to keep the pigs healthy and thriving. Big weights are 200

to 250 pounds at six months old, 400 pounds at ten months and 500 pounds at twelve months. A pound a day from birth is a good weight.

Mr. Barker. Mr. Mustard is correct; to get any benefits from this discussion you must talk methods, and to produce these big weights you must commence with the dam. I think you can make weights of 225, 240 and 260 pounds at six months and not injure the pig. But you must have a growthy pig, good, strong and well muscled. You must go back to the dam; must know her; know her pigs. Then mate her so she will produce the kind of pig you need to commence with. Then they must not be burnt out with corn, but they must have some corn, plenty of good range, a great variety of feed, good shade and pure water. The pigs must be made to drink milk as early as possible, commencing on warm skim milk, as pure milk contains too much butter fat and is liable to cause scours. Get them to eat as soon as possible. Commence by feeding a little soaked corn as soon as they will eat it, then give ground feed. Keep them in the shade and free from vermin and as clean as possible. Always have charcoal and salt where they can get it; also clear, cold water. Give them all they can eat without hurting their digestion. At six weeks commence using a little oil meal and increase the quantity as they grow older. Keep them healthy and this treatment will make pounds.

Mr. Cunningham. The entire plan has been given and it is good. As to my feeding, I have never made any special effort. I have never made a six months pig reach 250 pounds, and never reached a greater gain than a pound a day, and I think that a pretty good weight. But know that the right kind of a pig treated as described by Mr. Barker, and kept gaining until six months old, would surprise you in the weight made.

Mr. Barker. I would not recommend these heavy weights, but 180 to 200 pounds at six months old, for the professional breeder.

The next subject was No. 6, and was presented by A. S. Gilmour, Greensburg, Ind., as follows:

PRECAUTIONS TAKEN TO KEEP HERD HEALTHY.

BY A. S. GILMOUR, GREENSBURG, IND.

The first thing to provide for each animal is a good comfortable abode. The house should be large, with good roof and floor, well ventilated and with plenty of light and sunshine. These things are as necessary to the health and growth of stock as is good food. After being provided with these, the next thing the hog demands is cleanliness, both in its sleeping apartments and the surrounding lots. Bedding should be changed frequently, two or three times a week if weather is damp. Houses should be thoroughly swept and sprinkled with some disinfectant once in awhile to kill all disease germs which might exist. Stock should never be allowed to be around straw stacks or lie in any decaying vegetable matter, for there is no better source of disease than in such places. For food, corn is the base,

but through the course of the year we feed a great variety of other foods, as mill feed, middlings, wheat, bran and oats; also, for a change, they should be fed potatoes, turnips and apples. We have used oil meal, but regard it the poorest feed for hogs yet used; two bushels of flaxseed is worth a ton of oil meal for putting stock in good condition. Charcoal, ashes and salt should be regularly fed to stock. The best and cheapest food for hogs is a good clover or blue-grass pasture. Rye and wheat, while young and tender, also furnish excellent pasturage. Stock should be fed three times a day and as near the same time each day as possible. We feed corn morning and evening and slop at noon. In feeding grain a clean, grassy spot should be selected. Stock should be fed only what they will eat; the pig should never have unnecessary food lying around from day to day. We aim never to have more than twenty-five pigs in a lot of three or four acres, and always keep our hogs scattered as much as we can conveniently, locating them so as to have plenty of shade in warm weather and also pure water. If any symptom of disease appears in the herd, the one showing such symptoms should be removed immediately from the others. To insure strong, healthy pigs, sows should be bred so they will farrow in pleasant, spring weather, as best results have been gained from so doing. For two weeks before farrowing the sow should be fed light food, very little corn, slops being the food almost entirely. For some time after farrowing the same diet should be given.

The next subject was number seven, "What has been your Experience with Inoculation?"

J. Harcourt. I can answer this question, but my experience would not be very complimentary to this new cure for cholera and do not know as I should give it here (a voice, we want actual results, so others can benefit from them). Well, I had no cholera in my herd this spring, but I thought to be safe I would have them inoculated. I had part of them treated, they took sick and died. Those not inoculated and run with the others did not die.

Mr. Mugg. In June we had the veterinary come from Ohio and inoculate 191 head in our three herds. One of these herds escaped entirely, but the other two took the cholera and in my herd about one-half died, and I succeeded in saving the balance by hard work. The other herd was sent to the yards early before many had died. My experience leads me to believe that there is nothing in it. Some that were not inoculated lived, and some that had had the cholera, did not take it.

Mr. Mustard. My hogs did not take the cholera and I have not had the disease in twenty-one years.

Mr. Barker: Three years ago, Mr. Riley and myself had a few hogs successfully inoculated and Mr. Riley became very enthusiastic over this method, making several experiments, and had his hogs inoculated last spring, and about one-half of them died in about two weeks. Most places where inoculation has been tried in our section had hog cholera after pigs were inoculated. At the Champaign, Ill., Experimental Station they experimented with it and lost ninety per cent of their hogs. Dr. Detmers says the virus must be in proper condition or it is dangerous to put into a hog.

Mr. Oiler. I did not have my hogs inoculated, but two herds in our section were, and both lost their hogs from cholera.

The next subject was number nine, which was presented as follows:

MY OBSERVATION OF THE SWINE EXHIBIT AT THE FAIRS IN 1896.

BY E. R. HILL, WINCHESTER, IND.

As my observations of the swine exhibit were limited to the Indiana State Fair and two or three county fairs, those briefly noted here will apply to these particular exhibits. The exhibit of swine at all except one of the fairs referred to, showed a marked decrease in numbers as compared to former years, but a satisfactory improvement in the general average quality. But few sensational winners were brought out, while on the other hand there were few herds out that were not a credit to the breed to which they belonged. Another marked change from former years, was in the representation of the different breeds. There being quite a decrease in number of Poland-Chinas, while many of the others showed a substantial increase. These I do not think due to any sudden or widespread change in the relative number of each breed, bred and raised as compared to former years, but rather to the fact that some of our older Poland-China exhibitors concluded to rest upon laurels already won, and many younger breeders feared to enter the contest in this year of financial depression and dull sales, the exceedingly strong show made by this breed in former years having made competition so close that it was a lucky herd indeed that could pay expenses. As noted in the beginning, the improvement compared with former years has been in the line of bringing up the general average excellence of the breeds rather than in the advancement of the highest type of the individual. That there is yet room and need for the advancement of the general average excellence, as well as the further development of the individual type, is apparent to all close observers. To my mind, the one defect that marred the beauty most of this last exhibit was broken down feet, this fault appearing oftener than any other. That this is not due to a lack of size of bone is evidenced by the fact that it was in the breeds noted for large and coarse bone that it appeared most frequently. The management of this department was of the best and gave general satisfaction to exhibitors in every way, except in furnishing straw for bedding. However, this was not from a lack of effort or desire to please on the part of the superintendents, but owing to the unsatisfactory mode of furnishing straw adopted by our boards of fair managers—a plan that was all right and the best to be had in its day, but long since outgrown. Under the present system both the amount furnished and time of delivering are uncertain; the results are that often after your hogs are brushed and aisles swept clean and visitors arrive, straw is brought and your work is to do over again at an inconvenience to yourself and visitors. Nor is this all; you are often compelled to leave an intending purchaser, and even the show-ring, in order to get your share, and as the time of arrival of the next supply is very uncertain, much more than required for present

needs will be taken (providing the driver can be coaxed to throw it off), and for the want of a proper place to store it, all is placed in the pens, only to become foul and wet and must soon be removed. Let fair managers furnish each exhibitor at the beginning of the fair a sufficient amount of baled straw to last during the fair. The proper amount for each pen of hogs can easily be determined by experience. The exhibitor, having his supply constantly at hand, can supply his animals with fresh straw often and at times best suited to their requirements and his convenience, thereby keeping them in a much cleaner condition than when depending upon an uncertain supply, and knowing that if he is wasteful and exhausts his supply before the close of the fair it will incur extra expense on his part, he will use no more than is necessary. This would remove a source of great annoyance to exhibitors and superintendents and at but little or no increase in the cost. The judges employed were competent and gave general satisfaction, fewer criticisms being heard than usual—a fact that confirms our belief that there will seldom be a kick coming from exhibitors without a display of either ignorance, fraud or favoritism by the judge.

This paper would no doubt seem incomplete without some reference to the prevalence of cholera at our fairs. But as offering an objection without a corresponding remedy is so closely allied to fault finding that we can but hesitate to mention it. However, we would suggest that in view of the fact that some fairs take it upon themselves to furnish disinfectants, and others do not, that it would be well for exhibitors and fair managers to decide whose place it is to furnish disinfectants, then let superintendents see that they are used thoroughly at least two or three times daily in the aisles and pens, and on show days in the show ring, and remove from the ground all exhibitors who do not keep pens thoroughly cleaned and disinfected. Beyond these precautions we see but little encouragement.

DISCUSSION.

Mr. Barker. A very good paper, containing many valuable suggestions. I believe we should urge upon the board to give more attention to the pens and grounds. The pens should be disinfected, as was done at the World's Fair. The question of straw is important, and I believe baled straw by far the best. Portion out to each exhibitor his supply, and if he wishes to use more, let him buy it.

Mr. Mugg. I believe good, clean straw is important to health, and baled straw the best. At St. Louis they allow you so much to a pen, and if more is used, buy it in quantities as you need it. All State Boards should have the pens disinfected, or see that it is done by the exhibitors.

Mr. Oilar. What has been your observation as to the quality of the hogs at the fairs this year?

Mr. Barker. I went to fewer fairs this season than common. Think quality of stock fully up to former years. The State Fair not far from a good average. While speaking, I would say to Mr. Nowlin, our Secretary, and Superintendent of the Swine Department: In engaging straw, see to it that no hogs have been permitted to run to the stack.

On motion the meeting adjourned for supper.

EVENING SESSION.

At eight o'clock the Association was called to order and program continued. Subject number eight, "What Rules Must a Breeder Follow to Hold a Successful Sale of Swine?" was taken up.

DISCUSSION.

Mr. Oilar. I have had seven public sales. Have not reached any great prices, but made some money, and consider I was successful. To make a successful sale, you must have good hogs, of good size, and in good condition. Must advertise well, treat your visitors well, and have arrangements so that sale will move smoothly and rapidly. I never ran around and "swapped" hogs, always had a crowd at my sales, and always tried to send them home satisfied.

S. D. Ghere. I have had two sales. Whether successful or not leave that for others to say. First sale had a good crowd, and made a good average. Second sale was prevented by cholera. I am satisfied with the system. To be successful, you must breed right, have early pigs, sort close, and use buyers' right.

L. L. Moorman. I have had some experience. Held three or four sales, and expect to hold others. My first sale was good; sold ninety head for \$900.00. Haven't got much of the money yet. My last fall sale was not a good one. This system of selling has many drawbacks, as do other businesses. But it is about as good a way to sell as any I know of. Have tried the private sale, and on orders. The trouble with that is, you never know if the stock is sold, and can not tell when you will be called upon for a rebate. Have had calls for rebates months after I supposed everything was right. I like to have buyers see what they are getting, and, therefore, prefer the public sale system.

Mr. Smith. Public sales, like every business, has its objectionable features. The main one in stock sales is the credit system, and in that respect the public sale system is lacking. One must trust everybody and never knows when returns are all in. I have had several very successful sales, as far as averages are concerned. Have not got all the money in yet. My last sale was a failure because cholera had got into my herd, and not knowing that my herd was infected I sold at sale. Have sent back all paper as fast as notified of loss of the stock. The retailer has a big advantage here. He can at least protect others, if he is so unfortunate as to lose his own herd.

Mr. Moorman. One thing that is injurious to sales is the disposition of many to get rid of everything they raise. They do not cull close enough. The seller figures that if he makes a dollar or two over market price on some stuff it will be all right. But if they were to leave this common stuff out they would get more for the good stuff.

Mr. Cunningham. Is it not a fact that some sales sell stuff as low as five dollars, and do you not believe that the farmers are now getting on to the fact that all they have to do is to let the breeders have their choice and after that the balance can be purchased at their own price? I have known of 200 pound hogs selling at these sales as low as \$4.50 that were worth \$25. If I had had them I

would not have taken less than that for them. Is there not a disposition of farmers to work sales and get cheap hogs? Another thing, are not sales becoming, owing to the credit they give, a place where unreliable men, or men not worth a dollar, may stock up, never paying for it, and place themselves in competition with men who must spend their money to support their business? The boom sale is another drawback. They commenced in Indiana, but have now got into the West. Indiana has regulated her sales and has went to the other extreme of low prices. I know of a man that bought in two thousand dollars' worth of high priced hogs and never paid a cent for them. This was used as good advertising matter, just the same as if the seller had received the cash. Just such a system broke up the shorthorn cattle business and it will do the same for hogs. I have nothing against public sales. I want to see everybody make money, no one get swindled and all things that are wrong made right regardless of what system, breed or thing.

Mr. Barker. I have not had any experience in selling by public sale, but read the reports that are issued. I am of the opinion that these inflated sales, now so common West in Poland-China circles, is hurting the Indiana breeder. While at the World's Fair breeders from other States feared the Indiana hogs the most and they had cause too. Indiana Poland-Chinas, wherever shown, take a good per cent. of the best ribbons. But the great difference made in sale average between the Poland-Chinas West and East would create an impression that the hogs are inferior in the parts of the country where the sale averages are low. If these high prices are dishonest or inflated they should be exposed.

The next subject was number five, "Has the Score Card Caused More Rapid Improvement in Swine Than the Old System of Judging?"

DISCUSSION.

Mr. Barker. I believe the scoring schools have been a benefit to breeders, even though the card has not been used in the show ring to any great extent. Breeders have become more critical and careful in estimating their hogs. I believe it has been a great benefit. A matter that I wish to bring up here is the difference in scores. I believe Indiana judges do not score high enough as compared to other places. The West scores from three to five points higher than Indiana judges, and the impression is given that the hogs here are that much inferior, whereas Indiana has as good hogs as any State. We need either to bring all judges to the same standard or Indiana judges should raise their standard.

Mr. Mugg. Never scored in the ring, but believe the card of great advantage to judges and exhibitors, and I believe every breeder should study it and learn to use it. I hear lots of complaint about Indiana experts scoring too high, and perhaps they do. I have noticed that hogs that were scored in Indiana at 80 reached 95 in the West. Yet the men, I have noticed, that did that work are not in use at all now. The ribbons must be placed right, and the standard of the judge may be high or low, so the right hogs get the premiums. The score card, in my judgment, is a great aid to breeders.

Mr. Cunningham. I move we proceed with election of officers.

Motion was seconded and passed.

The election resulted as follows: President, John Harcourt, New Augusta, Ind.; Vice-President, E. M. C. Hobbs, Salem, Ind.; Secretary, H. Nowlin, Lawrenceburg, Ind.; Treasurer, A. S. Gilmore, Greensburg, Ind. Executive Committee, L. L. Moorman, Winchester, Ind.; Lloyd Mugg, Center, Ind.; B. P. Johnson, Mooresville, Ind. Committee on Program, H. Nowlin, J. Cunningham, E. K. Morris. Committee on Premiums, I. N. Barker, J. Cunningham, E. K. Morris.

On motion the expenses of the Committee on Premiums for 1896 was allowed and provision made for expense of 1897.

The remainder of the session was devoted to a talk by Prof. A. W. Bitting of Purdue University on

STUDIES UPON SWINE DISEASE IN 1896.

BY A. W. BITTING, D. V. M., PURDUE UNIVERSITY.

GENTLEMEN—The studies upon swine disease were conducted upon the following lines: *First.* To find what parts of the State had suffered the greatest loss and been visited oftenest by the disease during the several years that the statistics have been collected. *Second.* To determine what relation the river systems, topography and temperature of the different parts of the State had to the distribution of the disease. *Third.* To determine whether the number of hogs per square mile bore any relation to the death rate. *Fourth.* To determine at what season of the year the disease was present. *Fifth.* To determine whether State and county fairs might not be the means of distributing the disease. *Sixth.* To continue correspondence with breeders to determine whether the better hygienic measures already recommended would not protect in part against the disease. *Seventh.* To make trials of various remedies.

The work as here outlined has been completed. From the reports of the State Statistician obtained the data from which I could work out the total number of hogs in each county and get the per cent. that died. This was done for every year from 1882 to 1890. Through the courtesy of Mr. Thompson I was supplied with like data, from which I worked out the per cent. of loss by townships for 1895 and 1896.

Maps have been prepared showing the distribution of the disease by counties from 1882 to 1890, and by townships for 1895 and 1896. These maps form a most interesting series, making it possible to locate any considerable loss in any locality during the given period. They need to be published to convey the information they contain. The maps by counties have considerable value, but those by townships are far more valuable, as they show the per cent. of loss in smaller areas.

For the year ending April 1, 1895, the loss in 194 townships was between 10 and 20 per cent.; in 59 townships, between 20 and 30 per cent.; in 24 townships, between 30 and 40 per cent.; in nine townships, between 40 and 50 per cent.; in four townships, between 50 and 60 per cent.; in one township, between 60 and 70 per cent.; and in one, 73 per cent. of all the hogs produced. The remainder of the townships lost less than 10 per cent., making a total loss for the State of 278,143 hogs.

For the year ending April 1, 1896, the loss was distributed as follows: In 232 townships, between 10 and 20 per cent.; in 127 townships, between 20 and 30 per cent.; in 59 townships, between 30 and 40 per cent.; in 53 townships, between 40 and 50 per cent.; in 24 townships, between 50 and 60 per cent.; in 12 townships, between 60 and 70 per cent.; and in one, 77 per cent. of all the hogs produced. The remaining townships lost less than 10 per cent., the whole aggregating 580,267 hogs.

The one thing that is strongly emphasized by the maps is the greater loss along the rivers of the State. Dr. Salmon, in the report upon "Hog Cholera" from the Bureau of Animal Industry, in 1889, states that, "Perhaps the most potent agents in the distribution of hog cholera are the streams. They may become infected with the specific germs when sick animals are permitted to go into them, or when dead animals, or any part of them, are thrown into the water. They may even multiply when the water is contaminated with fecal discharges, or other organic matter. Experiments in the laboratory have demonstrated that hog cholera bacilla may remain alive in water for four months. Making all due allowance for external influences and competition with other bacteria in natural waters, we are forced to assume that they may live at least a month in streams. This would be time enough to infect every herd along its course." Our observations fully confirm the statement of Dr. Salmon. In 1895, 63 townships bordering the Wabash River, from Cass County to its mouth, show a loss of 15 per cent. of all hogs raised. During the same year the 47 townships one tier away from the river show a loss of 10.05 per cent., or a greater loss by five per cent. in the townships bordering on the river. In 1896 the bordering townships show a loss of 29.4 per cent., those in the next tier back 20.5 per cent., and those in the third tier 16 per cent.; the loss in the bordering townships being nine per cent. greater than in the second tier, and 13.4 per cent. greater than in the third tier. In case of the White River, 44 townships bordering on the river show a loss of 13.8 per cent. in 1895, and 42 townships in the second tier away show a loss of 6.5 per cent., or only half as much. In 1896 the 44 townships bordering the river lost 23.1 per cent., while those in the second tier lost 15.6 per cent., 7.5 per cent. more in the former than in the latter. These two streams have been taken to illustrate this point, because they flow nearly across the State, and the number of townships bordering their banks is so large that the claim of mere accidental occurrence can have little weight. Frequent visits of inspection to affected herds has afforded opportunities of witnessing the frightful pollution of these streams by dumping the carcass in the water to be carried down stream. What is true of these large streams is also true, to a greater or less degree, of smaller streams, and emphasizes the importance of using only well water for stock.

No relation was found to exist between the topography of the State and the distribution of disease, as the average loss in the highest and lowest counties in the State are nearly the same. The greatest loss has been in the Wabash and White River valleys. The northeastern corner of the State and the southern slope, toward the Ohio River, have lost least.

The percentage of loss bears no relation to isothermal lines. A season showing average waterflood in the spring-time and drought during the summer, so that water becomes stagnant, has been followed by greatest loss.

The percentage of loss bears no relation to the number of hogs per square mile, as shown by the following:

<i>Number of Counties.</i>	<i>Number of Hogs per Sq. Mile.</i>	<i>Per Cent. of Loss.</i>
6	Less than 50	5.2
20	50-74	5.2
10	75-99	7.8
17	100-124	8.4
10	125-149	6.9
4	150-174	9.3
9	175-199	7.7
9	200-224	7.7
6	225-249	9.3

One county not reported.

The opinion is general that hog cholera only occurs in the fall. To decide more fully the question, quarterly correspondence was carried on with 155 people in different parts of the State. The reports show that the disease is present every month, but only a comparatively small number die in the spring and early summer. The greatest loss occurs in September and October.

In a detailed report on forty-one outbreaks, occurring in May and June, it was found that thirty-four or eighty-three per cent. were on farms on which the disease existed the previous year. This is one of the strongest proofs of the necessity of stamping out all sources of infection. Shallow burial, so that parts may be recovered by other hogs, dogs, etc., and uncleaned quarters, harbor the germs so that, under favorable conditions, the disease breaks out anew.

As disease was present upon the State Fair grounds last fall, it was thought well to determine, if possible, how many breeders contracted the disease from that source. Through the courtesy of Mr. Charles Kennedy, Secretary of the State Board of Agriculture, I was furnished with a list of all who exhibited swine. After four weeks, a letter was addressed to each of the forty-two exhibitors, asking for a detailed statement of any outbreak of disease upon their premises. From the correspondence, I find five exhibitors lost hogs which might be attributed to such exposure. I was also furnished the exhibitors' list of the Ohio State Fair and a similar correspondence was instituted. To these lists must also be added about sixty exhibitors at county fairs. While it is difficult to decide whether a certain outbreak follows from a certain exposure the evidence is very strong when an outbreak occurs upon a farm in from ten to twenty days after exhibiting and only the show hogs are affected at first, and are, possibly, the only ones affected in

the neighborhood. As not all exhibitors replied to my queries, it is impossible to state what per cent. of hogs were lost. The evidence is sufficient, however, to make it an imperative duty upon every county and State fair management to use every means to disinfect exhibiting pens. Everything should be cleaned out at once after the exhibit is over. A month before the exhibit, every pen to which sunlight can be admitted should be thrown open. The interior of the building should be whitewashed or painted with paint mixed with turpentine instead of oil. An abundant use of some of the better disinfectants should be used in the pens during the exhibit. No man should be allowed the privilege of exhibiting who has the disease in his herd. The exhibitor should be careful that his crates and straw are not befouled by litter from some other man's pen. The matter of disinfection has received attention from our State Fair Board but is almost entirely neglected by county organizations.

The observance of sanitary precautions has not been sufficient to entirely ward off disease in all herds. When the disease has once gained a strong foothold in a community, the carelessness of those who have no regard for other people and the almost innumerable ways of carrying the germs are sometimes too great odds to be met by the methods that are at the command of the breeder. The correspondence shows that the loss has not been as great to the careful breeder as to their neighbors, and that good sanitary surroundings is the cheapest preventive that can be used.

It is unfortunate that the ideal of what constitutes a sanitary condition for a hog is so low or even better results might be obtained.

Tests were made with all the "cholera cures" found in the State. We found no specific nor anything that would cure sick hogs. Some remedies would apparently benefit one herd but prove useless in another. Various disinfectants were used, air-slacked lime, chloride of lime, whitewash, sulphur, corrosive sublimate wash, carbolic acid, coal oil, turpentine, and many others which were favorite of the owners. The main thing in the use of disinfectants is to use plenty and use it often. There is some choice in the selection of disinfectants, as those that are irritable to the hog are not desirable. Of the various new preparations on the market, we found chloro-naphtholeum to have some advantages over many of the old and more common ones. It is not to be relied upon as a sure cure. It is a disinfectant, an antiseptic, and has a febrifuge action. It is not irritating, nor have I observed any cases of poisoning. I used it internally in slops and water, and as a spray around pens. It has a tarry odor, and is not especially relished in drink by pigs. The experiments in which it was used, showed some beneficial effect.

The meeting adjourned *sine die*.

SEVENTH ANNUAL REPORT
OF THE
Indiana State Dairy Association.

ANNUAL MEETING

HELD AT

Lebanon, Boone County, December 29-30, 1896.

**OFFICERS AND MEMBERS OF THE INDIANA STATE DAIRY
ASSOCIATION FOR 1896.**

C. S. PLUMB, President, LaFayette, Tippecanoe County.
W. S. COMMONS, Vice-President, Centerville, Wayne County.
H. C. BECKMAN, Secretary-Treasurer, Brunswick, Lake County.

EXECUTIVE COMMITTEE.

C. S. PLUMB.	W. S. COMMONS.	H. C. BECKMAN.
C. B. HARRIS, Goshen.		J. M. KNOX, Lebanon.

MEMBERS FOR 1896.

Ashley, Geo., Ft. Wayne.	Beckman, J. N., Brunswick.
Auld, J. H., Decatur.	Benjamin, Charles, Leroy.
Bates, A. H., Arcola.	Bowers, Whitfield, New Castle.
Baum, H. M., Frankfort.	Chamberlain & Son, LaFayette.
Beckman, H. C., Brunswick.	Centerville Cry. Co., Centerville.

Cochran, M. A , Hanover.
 Commons, E. L., Centerville.
 Commons, W. S , Centerville.
 Comstock, Harry, Greenfield.
 Davis, Will J., Crown Point.
 Davis, Will J., Jr., Crown Point.
 Deist, S. W., Nashville.
 DeVilbis, Wm., Fort Wayne.
 Erskine, Jos., McCutcheonville.
 Gloyd, J. D., McCutcheonville.
 Harris, C. B., Goshen.
 Hadley, Milton, Thorntown.
 Headley, Wm., Ockley.
 Houck, J. E , Huntertown.
 Houck, Samuel, Fort Wayne.
 Huber, T. Cortez, Hoagland.
 Husselman, Cal., Auburn.
 Jack, W. S., Martinsburg.
 Jackson, Emmerson, La Gro.
 Jenkins, D. H., Indianapolis.
 Johnson, Alex., Fort Wayne.
 Kell, Geo. V., Huntertown.
 Kelsey, S. E., Momence, Ill.

Knox, J. M., Lebanon.
 Lovett, G. W., Kendallville.
 Luntz, John, Fort Wayne.
 Matthews, Harry, Brunswick.
 McCulloch, Chas., Fort Wayne.
 Monrad, J. H., Winnetka, Ill.
 Paul, H. C., Fort Wayne.
 Penn, B. A., Logansport.
 Peters, John C., Fort Wayne.
 Plumb, C. S., LaFayette.
 Schafer, T. A., Hagerstown.
 Schmal, Alf., Brunswick.
 Smith, W. C., Bellows Falls, Vt.
 Smith, W. F., Thorntown.
 Spice, Robert, Fort Wayne.
 Strong, E. D., St. John.
 Sudendorf, Ed., Elgin, Ill.
 Thomas, L. W., Pendleton.
 Van Arnam, M. F., Chicago, Ill.
 Welborn, J. M. T., Bridgeport.
 Woods, Sam B., Lottaville.
 Wiggam, C. M., Vernon.

LIFE MEMBER.

Hon. T. E. Ellison.

OFFICERS FOR 1897.

O. A. STUBBS, President, Lewisville, Henry County.
 CHAS. B. BENJAMIN, Vice-President, Leroy, Lake County.
 H. C. BECKMAN, Secretary-Treasurer, Brunswick, Lake County.

EXECUTIVE COMMITTEE.

O. A. STUBBS.	CHAS. B. BENJAMIN.	H. C. BECKMAN.
J. M. KNOX, Lebanon.		J. S. MOORE, Plainfield.

MEMBERS FOR 1897.

Alton, John W., Vincennes.
 Beckman, H. C., Brunswick.
 Beckman, J. N., Brunswick.
 Benjamin, Chas. B., Leroy.
 Billingsley, J. J. W., Indianapolis.
 Centerville Cry. Co., Centerville.
 Commons, E. L., Richmond.
 Commons, W. S., Centerville.
 Comstock, Harry, Greenfield.
 Echterling, Joseph, Bemes, Ill.
 Elsbach, Will A., Indianapolis.
 Hack, John, Crown Point.
 Hadley, Milton, Thorntown.
 Hanning, Edwin, Evansville.
 Harris, C. B., Goshen.
 Harris, L. B., Webster.
 Harvey, John, Carmel.
 Hoadley, Arthur, Ockley.
 Hoefling, C. B., Madison.
 Husselman, Cal., Auburn.
 Isenhour, J. E., New Augusta.
 Jenkins, D. H., Indianapolis.
 Johnson, Frank P., Howland.
 Johnson, P. L., Farmersburg.
 Knox, J. M., Lebanon.
 LaGrange, J. W., Franklin.
 Levering, Mortimer, LaFayette.

McCain, W. L., Hortonville.
 McFarland, Mrs. Jas., Southport.
 Matthews, Harry, Brunswick.
 Meyer, Otto, Cedar Lake.
 Moore, J. S., Plainfield.
 Plumb, C. S., LaFayette.
 Rippey, Matt. J., Syracuse.
 Riner, P. J., Lebanon.
 Roberts, Austin, Westfield.
 Rohe, John W., Centerville.
 Rotermund, H., Bemes, Ill.
 Shugart, J. N., Marion.
 Smith, W. S., Zionsville.
 Stephenson, S. T., Lebanon.
 Stubbs, O. A., Lewisville.
 Sudendorf, Edward, Elgin, Ill.
 Tappan, G. S., Liberty.
 Teter, Jacob P., Boxley.
 Van Arman, M. F., Chicago, Ill.
 Wabash Creamery Co., Wabash.
 Ward, A. F., Thorntown.
 Ward, Pearl, Thorntown.
 Waterman, M. H., Ridge Farm, Ill.
 Welborn, J. M. T., Bridgeport.
 Woods, Sam B., Lottaville.
 Yoars, Geo. M., Amboy.

LIFE MEMBER,

Thos. E. Ellison, Fort Wayne, Allen County.

HONORARY MEMBER,

Governor James A. Mount.

ARTICLES OF ASSOCIATION OF THE INDIANA STATE DAIRY
ASSOCIATION.

[AS AMENDED JANUARY 3, 1893.]

ARTICLE 1. The name of this Association shall be "The Indiana State Dairy Association."

ART. 2. The officers of this Association shall consist of the President, Secretary-Treasurer and Vice-President, and an Executive Committee, consisting of a President, Secretary, Vice-President, and two others elected by the Association. A committee of two, to audit the Secretary-Treasurer's accounts, shall be appointed by the President at each annual meeting.

ART. 3. The officers shall be elected to serve one year, or until their successors have been elected.

ART. 4. The regular annual meetings shall occur at such time and place as may be designated by the Executive Committee.

ART. 5. Any person can become a member of this Association for one year by the payment of a fee of one dollar. Upon the payment of ten dollars a person may become a life member. Honorary members, not to exceed five, may be elected, but said election is not to hold for over two years, except by re-election.

ART. 6. The President shall have power to call a special meeting at such time as in his judgment the interest of the Association demands.

ART. 7. The Executive Board shall have power to transact all unfinished business.

ART. 8. The Treasurer shall be the custodian of all the funds belonging to the institution, and pay out the same on the order of the President.

ART. 9. The officers of this Association shall perform such duties as usually devolve upon officers of similar organizations.

ART. 10. The President and Secretary shall each be allowed, out of the general fund, an amount equivalent to their actual expenses while attending Association meetings.

ART. 11. These articles may be amended by a majority vote of the members of the Association present.

INDIANA STATE DAIRY ASSOCIATION.

The Indiana State Dairy Association held its seventh annual session in the Lochinvar Hall at Lebanon, Indiana, on Tuesday and Wednesday, December 29 and 30, 1896.

The meeting was called to order on Tuesday, December 29, at 10:30 A. M., by the President, C. S. Plumb, of Lafayette, Indiana. The meeting was opened by a prayer by Rev. Cook, of Lebanon, Ind.

President Plumb. Ladies and gentlemen, I am sorry that we have so small an attendance here at this convention, but I feel from the evidence of what I have heard of this county that we will have a full house before we leave here. So I hope that none of you will be discouraged by the small attendance here this morning.

In the course of the meeting I trust those who speak will speak so all can hear you, and so the stenographer can get a complete report of what you say, that we may be able to have it for our records. The next thing will be music.

Some excellent music was given by Messrs. Ed. Lane and Charles Marvin, of Lebanon, Indiana.

President Plumb. The next will be the welcome address by J. M. Knox, of Lebanon, Indiana.

ADDRESS OF WELCOME.

MR. PRESIDENT, LADIES AND GENTLEMEN—I am sorry we haven't more people here this morning, for I know this address is immense. It is with a little pride, and a great deal of pleasure, that I am permitted to welcome these friends and strangers to our city on an occasion like this. When we have company we try to make them feel that they are welcome; the best room is given them, and the best entertainment is provided that is at our command, to make our guests' stay as pleasant as possible.

We are at this time called upon, as a city and community, to entertain company. Our guests are the members of the Dairy Association of the great State of Indiana, who have chosen our city in which to hold this, their seventh annual meeting. The best we have is none too good for them.

We welcome you to seats in this beautiful hall that our citizens have seen fit to provide for your use. Our musical friends will come from time to time with choice selections of both instrumental and vocal music, as a means of entertainment that is sure to please.

We have met for our mutual good, not as entertainers, but as co-workers in the highest branch of agriculture, seeking knowledge such as will better fit us to work more intelligently, that we may be better prepared to serve those who are depending on us for that part of their daily supplies, the absence of which is most felt from the bill of fare, to wit: butter, cream and milk. We realize the responsibility that is resting upon us as dairymen; we realize how little is known of the cow and her product; the more we know of her the more we want to know, and the more we may learn. We were not created equal in intellect and ambition, neither can we all have the advantage of a dairy education, such as may be obtained in our dairy schools. We can not all be expert butter-makers, or practical cheese-makers, or successful handlers of dairy stock; but, by the proper application of the help we can get from the dairy press and such meetings as we are permitted to attend, we may learn to do our best. There is room at the top in our work, as there is in other callings.

We realize the fact that it is as impossible to be a good dairyman without preparation as it is to be a good doctor, lawyer or teacher, without the proper training, by study, for the various duties of their calling.

This is not intended as an educational meeting only, but as an occasion of social enjoyment as well, where friendly greetings are expressed by word and act, forgetting for a time the hum-drum duties of the dairyman's life. Now this is your meeting, each one has some duty to perform, to ask or answer a question, or to be a quiet and attentive listener, storing up the good things that are said for future use.

In the name of, and in behalf of the citizens of Lebanon, I extend to you all a cordial welcome, hoping your stay in our city may be pleasant, and that your recollections of this meeting may ever be pleasant memories.

President Plumb. The next on the program is a "Response" by S. B. Woods, of Lottaville, Lake County, Indiana.

RESPONSE.

Mr. Woods. We accept the cordial welcome, and esteem it a pleasure to meet so many representative dairymen and farmers from this and other sections.

I have known of Lebanon since our dairy meeting three years ago at Crown Point, Lake County. Brother Knox was on the ground and staid until all the business was done in good shape. When we met the next year, away across the State at Centerville, Wayne County, where we met such a lot and so many good people, Brother Knox was there. And last year when we met at Fort Wayne, the big town, and had a small crowd—you know Mr. Monrad compared us to a weak band of Salvation Army people—Brother Knox was one of the few that was there; and when we heard they were going to have the Dairy Convention down to Knox's, I said to my wife, "I am going if we can raise the railroad fare." Times are pretty hard up there. Some have not their confidence restored yet, and some want you to take it all out in confidence.

Well, I got here all right, and we see a great many others in the same fix, and I believe before we get through we will all be glad we came.

I was over to Hammond the other day (Hammond, you know, is over there by Roby), and saw the editor of the "Lake County News," S. E. Swain. Well, he wanted to know what the news was. I said, "Oh, about the same as ever, only we are going to have a State dairy meeting down at Lebanon, in Boone County, and I wish you would give notice of it in your paper." "Why, yes," he said. "Down at Lebanon; why, that's my old home; was raised a short distance from there; of course I will." Said I, "What kind of a country have they down there?" "The finest in the world; it's the garden spot of Indiana, and a fine lot of people, too." And then I wanted to come worse than ever.

Well, we are here, and what are we here for? Is it entirely for the interests of the cows of Indiana, or is it in the interest of the dairymen and dairy women, and the little dairymen and dairy maids of Indiana?

It seems to me we have come together here for fun and business, in the interest of the dairymen of Indiana.

This continual feeding and milking the cows, hauling the milk to the station or creamery, or making the butter at home, gets to be a very steady thing unless there is a let up once in awhile; and how could we put in the time during these holidays more pleasantly and profitably than by coming down to Lebanon and having a regular old-fashioned Methodist love feast.

Every one here should make himself at home, and not be above speaking. "Let your light so shine before men that they may see your good works and glorify your Father, which is in heaven." Virgil Pierce, a good Methodist up in our country, says if you don't speak for the Lord you won't get the blessing, and it is just as true in a dairy meeting as in a Methodist meeting.

Why, there is so much to talk about I don't see how we will get through to day and to-morrow.

The next man on the program is going to tell us how to make the creamery pay at the present time. There are a lot of fellows near me up in Lake County who ought to be here to learn how to do that. They paid Davis & Rankin about three times what they ought to have paid for an outfit a couple of years ago, and they can't make the business pay, and the plant is standing idle. We have four professors from our Purdue, who are the advance agents of prosperity, and we can ask them all the questions we want to. That is their business, and that is what we are paying them for.

We have an excellent program, but in my opinion one more subject should be added, which I think is of vast importance, next to that of production, and I would like to hear from the best men of this State on the question of "Markets." We are producing not only more milk, cheese and butter than we can consume in this United States, but also wheat, corn, beef, pork, cotton, etc.

Now the question is, what is the best policy to pursue? We don't want any Republican or Democratic policy, but we want a sensible, wise, business man's policy. It is about time us common people were quitting partisan politics and getting down to business and make our Representatives, Congressmen and House of Lords attend to their business or kick them overboard. We want more sense, more justice, and less liberty. We want it distinctly understood that neither McKinley nor Bryan can bring prosperity until the people get down and produce

something to make it. Nor can the agriculturist alone, by working sixteen hours a day and producing big crops of everything, while the manufacturers and the factory workingmen are swearing "they can't do anything, nor won't do anything."

We dairymen and farmers have talked about sanitary conditions, warm water, warm stables, plenty of sunshine in the stables, and a balanced ration for the cows, until I think most of the fellows that attend these meetings have got it down fine. And now I think we ought to give our law-makers a little attention. I think if we would give them a right good balanced ration they would give down almost any kind of milk that we would ask them to.

We have not been idle altogether. If it had not been for the State Dairy Association meetings, Farmers' Institutes, etc., we could not now call Brother Mount, Governor. Nor could we hope to see our esteemed second Abraham Lincoln—W. D. Hoard, of Wisconsin—a member of the Cabinet, as Secretary of Agriculture, with President McKinley.

To the citizens of Lebanon we feel grateful for providing us an appropriate place for our meeting; to the people of Boone County for their generous support and attendance. For all this accept our thanks. I believe that this meeting here, and others we have had at other places in the State, have aroused an interest for profitable results, that are sufficient proof of the valued work and purpose of the State Dairy Association of Indiana.

President Plumb. We will now listen to the report of the Secretary and Treasurer for the past year.

Secretary Beckman.

TREASURER'S REPORT.

DEBITS.

Mr. C. P. Goodrich, two addresses	\$30 00
Mr. C. P. Goodrich, hotel bill	2 50
Mr. W. S. Commons, expenses	5 65
Mr. H. C. Beckman, expenses	12 65
Postage, soliciting advertising, etc	2 57
Envelopes	80
Letter heads	2 50
Express on copy for report	25
Stenographer	25 00
S. B. Woods, expenses to Chicago	7 70
Printing sixth annual report, expenses on cuts and freight on reports	65 00
Home Journal envelopes	1 05
Printing programs, seventh convention	6 00
Mailing programs	3 62
Mailing reports	2 10
	————— \$167 39

CREDITS.

Balance	\$20 38
Membership fees	65 00
Advertising in sixth annual report	80 00
	<hr/>
	\$165 38
To balance due	2 01
	<hr/>
	\$167 39

President Plumb. You have heard the report of the Secretary and Treasurer. What will you do with it?

Mr. Benjamin. I move the report be accepted as read.

The motion receives a second and is accepted.

President Plumb. The report stands accepted. I am going to take the liberty to deviate slightly from our program, and ask the musicians to favor us with another number. They have given us such excellent music that I think they will favor us with another short selection.

Music by Ed. Lane and Charles Marvin.

President Plumb. There are two things that I wish to call your attention to before we go on to the next paper, and that is, we desire a very liberal discussion on all papers. Now we all want to feel neighborly toward each other. We want to feel at home here. We don't want any bashfulness or stiffness. We want to get acquainted and have a good time. If there is anybody here who has questions to ask, at any time, let him ask them. We want to do everything which is for the very best interests of this association, and try to get as large a membership as possible. It costs but \$1.00 per year to be a member of this association and I want to invite you all to join. I hope every dairyman will take a membership in this association. The Secretary will give each person a certificate of membership. We have to depend upon the existence of the members to maintain the organization, and get our money from the membership and from what assistance we get from other sources; and I hope before we leave this town we will have the largest membership we have ever had.

Mr. Shafer, who comes next on the program, is not here, and as Mr. Stubbs, who comes next after him, will not be able to reach here until the next train, Mr. Riley will go on the program this morning instead of after dinner, Mr. Shafer taking his place. He will now address you.

THE IMPORTANCE OF MILK AS A FOOD FOR SWINE.

BY JAMES RILEY.

Mr. Riley. Mr. Chairman, Ladies and Gentlemen: In the first place, I wish to congratulate these people for their splendid music. It is the best instrumental music I have heard this winter, and I feel sure that if every Jersey cow in Boone county could have heard that music they would give a better flow of milk, and the milk would be better than the ordinary.

In my travels from Thorntown, Indiana, I had occasion to stay over the Sabbath with a good friend of mine who lives in Orange County. His name is Joseph Burton, and he is running a creamery at Orange, a small town four miles from Mitchell. My friend Jesse C. Stevens and I had to have some place to stay over the Sabbath, so we stayed with him. We were attending a Farmers' Institute at Jamestown and we wanted to stay with him, and he was only too glad to have us come. He said he would take us to Mitchell. When we got to Mitchell his daughter met us. We went down to his farm, and it was very near milking time, and his daughter excused herself and went into a room, and when she came out she had on bloomers. She looked like some boy. She was a sweet, pretty girl, and had a good education, being a graduate from a high school. She took her bucket and tripped off down the cement walk to the stable, and invited us down to see her Jersey cows. She had six Jersey cows that she milked. Well, we went down to see the stable and found it a little nicer than the Pike County poor house. They say there that the Commissioners are going to raise money to build a new poor house. Well, we went to look at the stable. It was just as clean as it could be. Everything looked nice. This nice little lady took down a nice, clean stool and sat down by her Jersey cow she called Bet, and began milking with both hands. She was an expert. She thought a great deal of her pets. She would put her arms around their necks, and it was a pleasure to see her. It would have lowered her dignity to go into a filthy stable and milk these cows, but everything was as nice and clean as could be. After she got through milking we carried the milk to the house and she strained it away, and went to her dressing room and came out nicely dressed and went into the parlor and played us some very nice music. She is a graduate of a high school. But this is off of my subject, and I hope the President will please excuse me.

THE IMPORTANCE OF MILK AS A FOOD FOR SWINE.

I have always had a curious longing to know what kind of swine Adam had in the beginning of his gardening in Eden, and whether from the poor specimens we sometimes see, if they had their fall by eating apples, as Adam and Eve did, or by eating or not eating something else; or to come to a later period, to know what kind of swine Noah (the first and oldest known importer) brought over in the ark.

All of our domestic and improved breeds of swine must have had their beginning from that importation, and the lessons are well worth learning, how careful selection, climate, and feed have developed so many types of swine. Now as food is one of the principal factors in the development of swine we will discuss the different kinds of feed.

Milk is the best of all the different kinds of feed. It is in itself a perfect balanced ration. It is the bed-rock of success in the improvement of swine. Mr. N. H. Gentry was once asked by Mr. Pickrell, "how he fed his pigs so as to make them weigh from 427 to 517 lbs. (as a lot of his did) at a little less than twelve months' old." He replied, "by feeding mill feed, mixed with milk, and not too much corn." In fact, he was by corn much as the Dutchman was who said, "Too much whiskey is very bad, but too much lager beer is shust right." So Mr. Gentry said that too much corn was very bad, but too much milk was "shust right." His reasons were that corn forced them too fast; that when fed exclusively on it, they got fat and patchy and quit growing too soon, while milk, besides its growing and cooling quality, made them not only eat more of their food, but it also helped them to digest it. Milk is therefore one of the principal factors in the improvement of swine. It contains the elements necessary to develop the bone and muscle and maintain a steady gain and a high degree of health and vigor.

At the Wisconsin Experimental Station, experiments were made in which two lots of pigs were fed for a given time; one lot on corn alone, the other on mill feed mixed with milk. A careful dissection and examination showed that the hogs fed for lean (that is the term used) showed that the per cent. of blood and muscle was larger, and the vital organs—heart, liver, kidneys and lungs—were from ten to fifteen per cent. heavier than those of corn-fed hogs, and what is most striking, that while the thigh bones of the corn-fed hogs, placed in the testing machine crushed at a pressure of about 300 lbs., those of the hogs fed on mill feed mixed with milk sustained a pressure of nearly 1,000 lbs. This test, which is authentic, emphasizes the importance of milk as food for swine, fed in connection with other bone and muscle producing food. It is also essential in the improvement of swine, as it should be fed to sows while suckling pigs. This will start the development of the bone and muscle in the pigs, then as soon as the pigs are old enough to learn to eat, commence to feed them a little whole milk warm from the cow, in a shallow trough, increasing the quantity as the pigs grow. When the pigs get well learned to eat commence giving skimmed milk with scalded shorts; when eight weeks old. wean them and feed shorts, mixed with sweet milk; supplement this feed with red clover or green rye, pumpkins and plenty of sun light, exercise and pure water all the time, depending on the milk as the most essential element in the feed ration. This will give us the broad, muscular back, and broad, full, deep, hams and strong legs and feet. Continue this method of feeding, coupled with careful selections and careful matings, and like will beget like, the excellent type of our breed becomes fixed, and the improvement goes steadily on.

We are running now a small farm dairy of twelve cows. We ship our cream to Mr. Furnas at Indianapolis. We feed the skimmed milk to the pigs. We make more money out of the milk we feed the pigs than out of the cream we ship to Mr. Furnas. We find we can not make the right kind of pigs without milk. You

should feed the milk sweet; sour milk is not good for pigs. It is not half as good as sweet milk.

Without milk our efforts to improve swine would be slow. The importance of milk as a food for swine is overlooked by the average farmer. Many farmers think that corn is good enough for the hog, and all that is necessary is to supplement the corn ration with a little mud. They pen their hogs in a pen somewhere on the corner of the farm where all the fertilizing matter will wash down on a neighbor's corn field. They have no floor to feed on but pitch the corn over in the mud. These men do not believe there is anything in milk as feed for swine, but they are interested in the most improved patent rings to keep their hogs from rooting. Milk is nature's most complete nourishment. If there is any one who wishes to ask any questions I would be glad to answer them.

Mr. Roberts. May I ask Mr. Riley whether there is any difference between feeding the milk warm and feeding it cold?

Mr. Riley. Feed it warm in the winter, but in the summer time it doesn't make so much difference. The chill should be taken off the milk in the summer time. I would never recommend feeding it cold at any time. The chill should be taken off even in hot weather.

Mr. Roberts. Then in case you use a cream separator, that enables you to feed the skimmed milk from the separator warm?

Mr. Riley. Yes, feed it warm, right from the separator.

Mr. Woods. We purchased a separator last spring and fed about twenty-five or thirty gallons of milk a day from the separator, warm. That is as close as I can estimate it. What we want to know is what value we can get out of that milk by feeding it to the pigs warm? What cash benefit is to be derived.

Mr. Riley. It is worth close to 20 cents to the 100 lbs.

Mr. Roberts. About six years ago we fed our hogs sour milk, and from that on up to about a year and a half ago, and the cholera got among our hogs and the people said it was the sour milk that caused it.

Mr. Riley. I think in one sense of the word it was the sour milk. It is not a healthy feed for swine, like sweet milk. The swine coming in contact with the disease while you were feeding sour milk, their systems were not in as good condition as they would have been had you been feeding sweet milk.

Mr. Smith. Mr. President, I have fed a great deal of milk to hogs, and sometimes the milk is a little sour, and if not too sour I feed it. At one time I hadn't very many cows and didn't get very much milk, and I didn't get my hogs up as early as I might, and the folks emptied the milk into a barrel. I got them up and the milk by this time had got very sour. I fed it to my hogs and it killed them. I think if it is not too sour it is all right. Right sour milk I am sure will kill pigs. I would like to ask a question: Do you feed skimmed milk alone or do you mix it with other feed?

Mr. Riley. I mix it with other feed. It causes the hogs to eat more of the other feed and assists in helping digest other food. I feed milk with oats and shorts and sometimes with this LaFayette hominy feed, and it is a good feed for small pigs. The stomach of a small pig is so very small that it requires rich food.

Milk is a rich food. After the pig gets bigger it requires something more substantial. I think shorts and milk make a very good feed for young pigs.

Mr. Smith. Did you ever try ground meal?

Mr. Riley. I never fed very much meal, and I have been a little afraid to use ground meal. I am afraid to feed it.

Mr. Woods. I think that Mr. Riley's experience ought to teach a good many of us the value of skim milk. There are very few who get 10 cents per 100 lbs. out of skim milk. I think it best to feed skim milk warm, but there are very few farmers that ever do this. I had some pigs that I had fed on sweet milk and they weighed 415 lbs. at twelve months old.

Mr. Riley. Mr. Gentry is rather an exception to the rule. He is a stock man. That would not be practicable to general farm stock. He was doing his best to get a premium at the World's Fair.

Mr. Nelson. There is one reason that he feeds his hogs so well. He sells them at a good price. My rule is to feed them all the corn you can and keep them healthy. Feed them just all the corn you can, and that is the best we can do and sell them at \$3.00 per hundred. I give my pigs clover, and bluegrass is good, too. I raise a great many pumpkins and feed them, too. But my rule is to feed them all the corn you can. Now, some say raise your own meat; it makes better pork. We are feeding for the money, not for the pork. We raise the hogs we can raise the cheapest, and upon the most corn we can get into them.

Mr. Riley. Mr. President, would you let me indulge in about five minutes to reply to Mr. Nelson? I would suggest a better plan. Let us feed our corn to the cows and feed the milk to the pigs. I believe that is why we have so much hog cholera. It is largely due to feeding so much corn. Take the map of Iowa and note how many counties there are in which the hogs die of this disease. The percent. that die from cholera run from 50 to 76 out of the six millions. And I tell you that I believe that if these hogs had been fed on milk and shorts for the first four months and then been put on a good clover field, and not have fed them so much corn, they would have produced a good healthy body. We want a healthy hog, and I tell you if the Americans would take more pains with their hogs and give them more milk, especially when they are young, we would put on the market perfectly healthy hogs. We could raise healthier hogs than anybody else. Do not feed a corn diet for the first four or six weeks. We must not depend on an exclusive corn diet at any time. After they get big enough for the market there is nothing better than corn if we add a little milk and clover.

I want to relate a little incident that happened at Scottsburg: There was an old gentleman that entertained us there and he kept inquiring about ringing our hogs. He had his hogs in a dry place and fed them corn. He complained of them rooting all the time and trying to get out under the pen. He said he was going to ring them and make them quit rooting up the dirt. I told him there was no use ringing them, just turn them out where they would get plenty of sunshine and they would quit their rooting. My friends, whenever you see hogs standing on their heads and rooting down you may know there is something wrong. I told him to turn them out on a good clover field, give them plenty of skim milk and bran, and note the difference. It was no wonder those hogs were standing on their

heads; that was the only exercise they got. I never ring my hogs. I know they can tell me when their system is out of fix. If I stick my finger in the flame I soon find out that it is not good for me, and I need to do something with my finger besides hold it in that flame. So whenever you see a hog stand on its head and root down, you must feed him bran and more skim milk.

President Plumb. We have exhausted all the time we have for this subject, and I now take pleasure in introducing to you Mr. Mortimer Levering, who will talk to you on "A Trip to the Jersey Island."

A TRIP TO THE JERSEY ISLAND.

BY MORTIMER LEVERING.

MR. PRESIDENT, LADIES AND GENTLEMEN—When our Chairman asked me to give you an address to day I asked him if I might talk it or have it written. He said he would prefer to have it written. So you will pardon me for writing it.

I was reminded of one of our speakers being embarrassed, and it reminds me of a story of a man who went to a doctor who had advertised to cure stuttering. The doctor said, "Do you st utter all the time?" And the man said, "No, only when I try to talk." And I believe the gentleman was only embarrassed when he tried to speak. (Laughter)

It is easier to praise than to criticise; it is pleasanter to speak of the beautiful than the homely; it is more delightful to emulate the successful than to picture the unfortunate.

Then, it is our pleasure to-day to speak of a country that possesses each of these admirable characteristics; the most beautiful, delightful, charming, prosperous, self-sustaining country, in population to area, on the globe, the Jersey Island.

Heat, light, air and water are the primary essentials of life; each of these is given in the purest form and unlimited quantity to that little gem of the sea, situated one hundred and twenty-five miles south of England and sixteen miles west of the coast of France.

Travelers are so adverse to stopping at points that are not on the main line of travel, and to changing cars or boats, that they often miss the most interesting objects and content themselves for the loss by saying "it was out of the way." For this reason few people who go abroad visit the six islands known as the "Channel Islands," consisting of the Jersey, Guernsey, Alderney, Sark, Herm and Jethou, situated from four to seventeen miles apart. The chief of these is the object of our talk. It is worth the time and labor of crossing the wide Atlantic, to say nothing of leaving London at eight in the evening, taking train to the boat at Southampton, and in twelve hours landing at the busy wharf of the Jersey Island, to visit this bright diadem of earth's circle. Here the sun shines its softest and warmest, not bl. zing and frying everything into a crisp, here the rain falls gently

and frequently, not driving and deluging, wasting and tearing; here the winds blow an ever constant cooling and refreshing breeze, not a roaring, devastating hurricane or a depressing calm. No intense heat of summer or freeze of winter blights or kills the vegetation, or distresses the inhabitants or animals.

The island contains fifty thousand acres of land, twenty-five thousand of which are used for farming purposes, ten thousand in crops, the remaining fifteen in orchards and pastures. We have spoken of this little spot as a "country," and justly, for it can boast a history antedating that of England, ruins as old as those of Egypt, laws as ancient as the Roman, castles strong as the hills, and contemporary with the Aztecs; principles of liberty and independence founded in the days of William the Conqueror.

The Channel Islands belonged to the Dukes of Normandy, and came into the possession of the British crown by William the Conqueror in 1066. The French appreciating the value of the island made many invasions and conquests to regain possession of it, but they, like the Swiss and American Colonies, the islanders maintained their own independence, and for centuries kept France at bay. So great was their fear of the Norman invasions that they put in their church Litany, "And from the fury of the Normans, good Lord, deliver us." The island is ten miles long by an average of five miles wide. The coast is generally high, and granite cliffs withstand the wash of the sea. There are several beautiful bays and inlets. Each of these is protected from the landing of hostile boats by "Martello Towers;" these are round forts built of granite, about thirty-five feet in diameter and twenty-five feet high, with loopholes. These forts and the impregnable castles are supposed to have been built in the time of Cæsar. Lighthouses on the dangerous rocks warn off the mariner. The north part of the island is highest, and the general slope of the land is toward the south, which is to its advantage from an agricultural standpoint. On the beautiful bay of St. Aubin, on the west coast, are situated the towns of St. Helier and St. Aubin, the former the capital and principal town, containing slightly more than half of the sixty thousand inhabitants of the island. Centuries ago the island was divided into twelve parishes and a church built in each, the most modern of which was completed in 1393. From each of these granite churches was built a road twenty-four feet wide in the most direct line to the sea. These roads are to day as originally laid out. There were three kinds of roads traversing the island at short distances. They are called: 1. "Le Chemin du Roy," twelve feet wide; 2. "Le Chemin de huit pieds," eight feet wide; and 3. "Le Chemin de quarte pieds," four feet wide. The widths indicated meaning the roadbed proper. These are made of broken granite and all kept as hard and smooth as a marble slab. Each parish is required by law to keep all its roads clean and in perfect repair; men, women and little children are delegated to keep constant watch of passing vehicles, and sweep up immediately any droppings or rubbish that may fall upon the road. Once a year the Governor of the island, with twelve Judges, preceded by a High Bailiff, ride in great pomp and with critical eyes to inspect every road on the island. The Bailiff carries a scepter upright on his saddle horn, and if any branch of a tree hangs down to touch it the owner of the land adjoining is thrown into prison and fined. If any fault be found with the roads in a parish all the people in its confines are fined,

and woe to them if they do not pay at once. The sweepings from the roadbeds, thrown at the sides, have been piled up for centuries, until they often hide the adjacent fields from the view of the pedestrians. These banks of sweepings are covered with beautiful vines; flowers and trees have grown upon them until they meet overhead in perfect arch of shade. One can not describe the beauty and comfort of these lanes and wooded drives, broken at short intervals with vines and moss-covered granite, arched gateways, opening into the homes of the farmers, or containing a fountain of the purest spring water, bubbling out of a granite monumental pile. The island abounds in springs, rivulets and little streams of clearest and purest water. Everywhere is to be seen green grass and bright flowers. Over old ruins, neglected spots or deserted buildings the green mosses and vines quickly cover their unsightliness with a mantle pleasing to the eye, transforming the moldering heaps into a living bank of radiant luxuriance. Bordering many driveways are crepe myrtle bushes, fully thirty-five feet in height and trimmed as smooth as the wall of a house and covered with blooms. Jessamine and Rhododendron hedges are numerous and as high as two-story houses. Fuchsias grow to trees the size of our apple trees and bear thousands of lovely drooping flowers. Frost is seldom seen, and flowers of every kind live out of doors.

The climate is equable—never too hot, never too cold—making the island an ideal spot for the invalid or rest and pleasure seeker. There is no miasma, and pulmonary troubles are unknown, either in people or cattle. How much more than the ordinary tourist would the lover and breeder of dairy cattle enjoy the Fatherland of the Jersey! Here may be learned, in a practical manner and without the aid of experimental stations, the very best example of "intense farming," "agriculture that pays," "ten acres enough," "five acres too much," "how best to till the soil," "what best to grow," and "how to maintain the greatest number of cattle on smallest acreage." Those people who at home think they have attained superiority in these matters, when visiting the Jersey Island may be prepared to meet surprises and yield the palm in reverence to the Jerseymen.

The noticeable characteristics of the inhabitants are hospitality, thrift, industry and integrity. They have all of the better qualities of the English and the "verve" of the French. While they owe allegiance to England, they still speak the Norman language of their fathers, which is ancient French, and may be compared with modern French as the Pennsylvania Dutch is like German. The older people speak English; it is the trading language of the town, but the children rarely understand it. French is the language of the courts. Hospitality is put first, for it first impresses you. When visiting the farmers at their homes, every man, woman and child on the farm exert themselves to make you welcome, and show you everything that may interest you. While you are examining the herd, the mistress spreads a snow-white cloth and sets out thin slices (about one-sixteenth of an inch thick) of the whitest bread, cold roast beef and mutton, sweet milk, buttermilk, hot tea, small cakes and preserves, and you can not refuse the urgent invitation to "come in" and partake of it. No excuse of limited time or the number of repasts you have had that day will be entertained to let you off. You simply must be agreeable and eat something. Should you visit fifty farms a

day you must sit down fifty times and partake of these sweet, dainty, quickly prepared lunches. At one farmer's house the husband was not at home. We entreated to be let go on to another place, but the wife would not listen to it, sending the children to show us the cattle while she set out the usual lunch, and we were obliged to sit down at the table. Every minute the lady would run out to the vine-covered gate to see if her husband was yet in sight. Once when coming in the house, pressing her hands over her eyes, she exclaimed in the most excited manner, "I want John to come so much that my intense longing will certainly draw him here. Please! please wait; he must come; he surely will be here in a minute!" But he did not come, and we could not wait; so we left her wringing her hands in regret, making us promise to return and "see John." We compared this sort of Jersey hospitality with what is commonly met with in our own country, where, usually, if the lady of the house sees a party of three or four men drive up to the front gate, goes to the farthest room in the rear of the house, and answers you only when you have knocked at every door and kept a vicious dog at bay at the same time. Fearing you would damage the doors, she opens a small crack and tells you "no," "no" to everything you ask.

The island contains 39,000 acres of land and rock. Here 25,000 acres of land, good and bad, furnish a good, comfortable living—far better than the average of our country—for 60,000 inhabitants, 13,500 Jersey cattle, 3,000 horses, 7,000 sheep, and they export \$3,300,000 of farm products and \$1,000,000 worth of hewn granite, and compare our counties with it. An average county in our State possesses eight times as much land as the island. Should we make it as productive, it would be able to support 480,000 people, 14,000 cattle, 24,000 horses, 66,000 sheep, and sell \$26,000,000 worth of produce and \$8,000,000 worth of wood or stone. The size of farms vary from one acre to twenty. Lands acquired by inheritance can not be sold or traded, but must descend to the oldest son or be divided among the family. Debts can not be evaded, and few are made. Farms rent as high as \$50 per acre. The Islanders are favored with perfect climate, and the land may be kept ever fertile and productive by a fertilizer nature provides and the waves of the ocean carry to it and places on their shores. This is a sea weed known as Vraic. Immense quantities of this grow on the shores. The cutting and gathering of this is regulated by strict laws, and all are obedient to customs established in former generations. At the two seasons of the year when it is time to reap this weed a grand gala time is observed. The time allowed will not permit us to go into the details of their farming and the manner in which they produce such enormous crops of tomatoes, potatoes, parsnips, grapes, etc. But such is the home of the Jersey cattle. Is it not natural that they should be gentle, kind, docile, willing servants of mankind, surrounded for countless centuries with such environments? They are as pure bred and as exclusive in 'caste' as the Parsee who lives to do some great good and never was known to marry out of his 'caste.' The exponent of some other breed can not boast that his has given some meritorious quality to the Jersey. It is the result of line breeding pure and simple, and the best and most satisfactory exposition of it in the world. No other breed of cattle is allowed to be kept on the island, not even for exhibition. From time immemorial the law of

the island relating to bringing in cattle has been this: "Any one who shall import into the Jersey Island any cow, heifer, calf or bull shall be fined two hundred livres (\$50), and the vessel carrying any such animal into port shall be confiscated, with all its tackle, and every sailor belonging thereto be fined fifty livres who does not immediately give information to the authorities of such animal being imported. And such animal must be slaughtered in port upon arrival, and the meat distributed to the poor." This law has been scrupulously observed for more than one hundred and fifty years. Great care has been taken in selecting bulls. Two or three are kept in each parish. Color and black points were also required. Any bull calf having as much as a fleck of white, no matter if it was the most choicely bred on the island, its pedigree would not save it from the butcher's block. From this selection of sires the solid color and black points universally prevail. All the white on the cattle we saw would not make the size of a large napkin.

In the year 1835 a committee of the best judges in Jersey, was selected to formulate a scale of points of excellence, and we believe it remains unchanged to this time. It reads as follows:

1. Head, small, fine and tapering 1 point.
2. Cheek, small 1 "
3. Throat, clean 1 "
4. Muzzle, fine and encircled by a light color 1 "
5. Nostrils, high and open 1 "
6. Horns, smooth, crumpled, not too thick at base, and tapering 1 "
7. Ears, small and thin 1 "
8. Eyes, of a deep orange color within 1 "
9. Eye, full and placid 1 "
10. Neck, straight, fine, and placed lightly on the shoulders 1 "
11. Chest, broad and deep 1 "
12. Barrel, hooped, broad and deep 1 "
13. Well ribbed home, having but little space between the last rib and the
hip 1 "
14. Back, straight from the withers to the top of hip 1 "
15. Back, straight from the top of the hip to the setting on of the tail,
and the tail at right angles with the back 1 "
16. Tail, fine 1 "
17. Tail, hanging down to the hocks 1 "
18. Hide, thin and movable, but not too loose 1 "
19. Hide, covered with fine soft hair 1 "
20. Hide of good color 1 "
21. Fore-legs short, straight and fine 1 "
22. Forearm, swelling and full above the knee 1 "
23. Hind quarters, from the hock to the point of the rump, long and well
filled up 1 "
24. Hind-legs, short and straight (below the hocks) and bones rather
fine 1 "
25. Hind-legs, squarely placed, not too close together, when viewed from
behind 1 "

26.	Hind-legs not too close in walking	1 point.
27.	Hoofs, small	1 "
28.	Udder, full in form, i. e., well in line with the belly	1 "
29.	Udder, well up behind	1 "
30.	Teats, large and squarely placed, behind wide apart	1 "
31.	Milk veins very prominent	1 "
32.	Growth	1 "
33.	General appearance	1 "
34.	Condition	1 "

Perfection 34.

No cow shall be awarded a prize not receiving thirty points.

No prize shall be awarded a heifer not receiving twenty-six points.

Cows receiving twenty-seven points and heifers twenty-four points shall be allowed to be branded, but may not take a prize.

In some respects a scale of one point for each characteristic is better than the ones we use of one hundred points.

As an evidence of how well the herds are selected, and what a large proportion go to the block, it is only necessary to say that the number of cattle on the island has varied only about 2,500 in the past century. In that time the minimum number being 11,000 and the maximum number 13,500. About 4,000 calves are dropped every year on the island, yet the aggregate number of cattle remains the same. They have never suffered a plague or an epidemic, and tuberculosis is unknown among them. From birth all cattle are kept by the halter and they are tethered out to stakes while feeding during the day, and when the weather is cool or raining, are put into sheds at night. The cattle are tied to stakes about thirty feet apart in a perfectly straight line across the field; each day they are moved forward thirty feet in the same straight line, and so on until the field is traversed from one end to the other. By that time the grass has grown where they began, and they are taken back and fed in the same manner over the field. All droppings are carefully gathered and removed to a large tank and put back upon the land in liquid form, which keeps the pasture even and clean.

When the Islanders milk cows they milk into a bottle necked can, over which is drawn a fine piece of linen that sags down a few inches, in the bottom of which is placed a round sea shell to take the wear of the milk stream and save the cloth. The milk in this way is strained and dirt and insects prevented from dropping in the can of milk.

The cattle on an average are superior to ours, in uniformity, size, quantity of milk yielded, and butter made. The butter is of the richest deep gold color without artificial coloring, made into one pound drops, and laid on a cabbage leaf. These leaves grow on what is known as "cow cabbage." The stalk grows from five to ten feet in height, perfectly straight, about one and one-half inches in diameter at base; the leaves grow thick all the way up the stalk, and a small head at the top. The leaves are pulled for butter plates, and the stalk either fed to cattle or dried and sold to visitors for canes or Alpine staffs.

All the cattle are very well cared for, and very docile, the owners and the children are constantly handling them on the halter, going to and from pasture and water. Generations of kindly association has made them pets.

It is noticeable how clean the cattle and horses are kept on the island. Most of them are brushed or washed every day. On Sunday morning it is the custom to take all the horses to the sea and give them a swim and bath. In the bay in front of St. Heliers on Sabbath morning you may see hundreds of horses swimming about, some with riders on their backs, some without, and they challenge each other for a long swim out to sea. The horses seem to enjoy the swimming.

Thrice blessed are the people. Thrice blessed the cattle who may count their home on the Jersey Island, and to the visitor who is possessed with a grain of sentiment or taste for rural life, or admiration of peaceful, profitable farm management, the pastoral repose of the Island of Jersey inspires a joyous memory of grateful contentment. A Eutopia that is not new, a Garden of Eden without a curse, a picture that "lingers in the mind, a gracious and beneficent remembrance."

DISCUSSION.

President Plumb. This paper is now open for discussion. Is there any question you would like to ask Mr. Levering?

Mr. Benjamin. In regard to the color of the cattle of the Jersey Islands. What is the natural color?

Mr. Levering. The silver greys prevail.

Mr. Benjamin. Do they have much white on them?

Mr. Levering. I have never seen much white.

Mr. Smith. Has it always been that way?

Mr. Levering. Yes, it has always been that way in the Jersey Islands.

Mr. Woods. How is it that so many white or colored Jerseys are in the United States?

Mr. Levering. I presume it comes about from this: On the Guernsey Island no attention has been paid to the solid colors. Most all the animals on the Guernsey Island are fawn and white. On the Alderney Island all the animals are more or less white. In the early days they were nearly all called Alderneys because they were imported from the island of Alderney, but it became more fashionable to call them Jerseys. And then they called them Jerseys, and having white in the family this white kept cropping out in the different generations, so we have the different colored Jerseys. The Jerseys are nearly all fawn in the Jersey Island, and I doubt very much that we ever got an animal from the Jersey Island that ever had any white on it. If a bull had a white spot on him as big as the end of your finger they would deem him only fit for the slaughter house.

Mr. Knox. Mr. President, I think this a little out of the line of the discussion, but I just want to say that old "Tormentor" had a little white on him. He is a Jersey.

President Plumb. He had some little white on him.

Mr. Levering. I think very likely that he may have been bought when very young and the white appeared on him afterwards, as it will do sometimes. I be-

lieve if there was a calf dropped and it had a bit of white on it they would kill it. You know that all kinds of cows breed an albino once in awhile. All animals breed albinos. You will see a perfectly white negro, a perfectly white crow, sparrow or canary bird.

President Plumb. If there is nothing further we will stand adjourned to meet at 1:30 P. M.

TUESDAY AFTERNOON SESSION.

President Plumb. The first thing on the program this afternoon is a paper on "Observations on the Use of the Separator," by Mr. J. H. Hilfiker, of Westville. Mr. Hilfiker could not be present, but he sends his paper. I will call on Mr. S. B. Woods to read his paper.

OBSERVATIONS ON THE USE AND CARE OF THE SEPARATOR.

BY J. H. HILFIKER, WESTVILLE, IND.

As the separator has passed the experimental stage and proven its practicality in the hands of wide awake dairymen, it is useless to speak of its merits, so I will speak only upon some of my observations on the care and management of it. It is very important at the start to get a standard make of machine, and then buy on trial, as some machines of standard make will not do perfect work, owing to carelessness in the making. Do not keep an inferior working machine, no matter how cheap, for the best of anything is none too good for dairymen. The machine should be carefully set according to instructions accompanying it, and then should run very smoothly, without any rattle in lower bearing, and the bowl should run perfectly steady, not wobbling nor vibrating, and it should skim to a trace, not one-tenth per cent., but a trace in the strictest sense of the word, and in doing this make a cream practically free from froth and churned appearance.

It is very important that you get a perfect separation in churning as well as in separating, and to do this you must have a smooth, evenly ripened cream. All machines will froth more or less, but frothing should be reduced to a minimum. This can be done by adjusting the height of bowl (which can be done while running if necessary). Most bowls should be raised as high as possible; this throws the cream against the horizontal cream cover, thus gradually checking its speed. Running the bowl high has another and often important advantage, as the bowl when at full speed causes quite a suction or draft, and the suction is sometimes through the covers and down around the neck of bowl, drawing some of the cream from cream discharge and mingling it with skim-milk and by raising the bowl you partly close this opening above and diminish the suction through covers of separator.

The usual way a machine gets out of repair is by wobbling or unsteadiness of the bowl, and when allowed to run in that condition greatly impairs its efficiency and also greatly shortens the life of the machine. The causes of the wobbling are, an unlevel frame or a faulty rubber ring, that cushions the neck bearing. In leveling the frame, one can use the square and plumb, by laying the square (on edge) across top of frame and plumbing the vertical end, or by laying a smooth, flat pane of glass on frame and placing a new steel ball (belonging to lower bearing) on the glass, and when the ball will not roll off of its own accord your machine will be practically level. But by far the best way is to have a good spirit level and keep the machine perfectly level. If your machine is level but continues to wobble the fault lies in the rubber ring. Some machines are so arranged that you can increase or diminish the pressure on neck bearing while in motion; with others you must take the bowl out first, but with the majority you must take out the rubber ring and repair it, or replace it with a new one; but nine out of ten can be made to work as good as new by simply taking a sharp knife and cutting away from top and outer edge, being careful to cut as evenly as possible, that is, with flat rings, but if using round ones, commence at the outer edge and cut to center of ring, removing a wedge shaped piece.

The cause of the uneven expansion in rubber rings is too much or too little oil. If too much, it overflows and saturates the ring, and if too little oil is used the neck bearing will heat, burning the ring. When the ring in bowl swells and gets too large to fit crease, it can also be cut and a piece removed; then glue with rubber cement. If the separator has a ball bearing the steps can be ground when worn, thus saving the expense of new steps.

In purchasing a separator I would get one of a larger capacity than really necessary, for capacity in separators is set with about the same measure that you set the capacity of a herd of cows, very high, in fact just barely within your reach. One can safely throttle the capacity, but can not unduly increase it and get good results. If the separator at full feed and full speed, at a temperature of 85°, does not do perfect work, decrease the feed and raise the temperature, but do not increase the speed unless necessary, and then never increase more than one-twelfth rated speed. Never use animal fats to lubricate, as they gum bearings, causing them to heat, and in using mineral or vegetable oil it is a good plan to flush bearings with kerosene at least once a month. In flushing a bowl after the milk is all separated, use water about ten degrees warmer than the milk just separated, using about enough to twice fill the bowl; this will force the remaining cream out better than skim-milk or water at a lower temperature. While a separator is a simple machine, it requires care and judgment to operate one so as to get perfect work, but it does not require an expert.

DISCUSSION.

President Plumb. The use of the separator is a very important thing, and we have quite a number of persons here who, I am sure, have charge of separators, and we will have a little discussion upon this subject. Mr. Roberts, can't you tell us something about the separator?

Mr. Roberts. I have had no experience.

Mr. Harvey. Mr. Chairman, I am not very much of a speaker, but we have been using a separator for the last two years with very satisfactory results to ourselves. We find that we can get a more uniform amount of cream and it makes a more valuable butter. It is necessary to have the machine well balanced, so the bowl will run right and smooth. It is also necessary to keep the machine well oiled, and you need to use it with some discretion and judgment. We have been using one for over two years.

Mr. Levering. Mr. Chairman, I believe the general fault that has been found with cream that has been separated by the separator is that it won't whip. Now, I will tell you how to remedy that: Just take a pint of water and put five tablespoonfuls of granulated sugar in it, dissolve it thoroughly, add one tablespoonful of quicklime and let it stand until all the settlements of the lime have gone to the bottom of the vessel you have it in, and pour it off without disturbing any of the settlements. When you sell the cream, add a tablespoonful of water and stir it before the cream is put away. That cream will whip as clearly as any you ever saw. When you go to take the cream from the separator put the pan, or whatever you draw it off in, exactly under the mouth of the spout that gives out the cream. Don't hold the pan down so the cream will have to fall so far through the air, for the effect of the air on the cream causes it to curd sooner. I have tried that, and tell it because it is worth knowing that it will do that. We find that the cream that has lime water added to it will keep better. It rather improves it, too. You get a different quality of butter from it also.

Many separators, when you first start them up, make a great rumbling noise. You will overcome that if you will fill the bowl with hot water before you set it in the machine. Then start the machine and it will work all right and overcome that. The reason the machine vibrates so is that there is not weight enough to hold it down. And many people find that this vibration is hard on the machine. First fill the bowl with hot water and then it will be all right.

Mr. Johnson. Mr. Chairman, did I understand Mr. Levering to say that the water will stop the rumbling sound? I am glad he told us about that.

In regard to the separator, it certainly is an indispensable piece of machinery in a dairy. We are running a milk and butter dairy. We purchased a separator last spring and it gives perfect satisfaction. Our object was to sell butter, but in delivering the butter to our customers we find that there is a greater demand for cream than for butter, and our only trouble is to keep from working all the cream into the retail trade instead of butter. They find no fault with it. We certainly make a better class of butter since we used the separator, than before. And as I stated this morning in response to Mr. Roberts, skimmed milk for hogs, we certainly

get a benefit out of skimmed milk that we never attained before. We get one other great benefit out of the skimmed milk by using the separator: In setting it in the old-fashioned way it does not give the sweet, warm milk like the separator. We have had our separator since last spring and as I said before, it has worked with satisfaction and I don't see how we could do without it.

Mr. Echterling. I have set them up but I have never had much experience with their working. I have noticed the rumbling sound.

Mr. J. E. Isenhour. I have used the separator for nearly two years. I purchased a separator from Mr. Harvey. I tried every other mode that ever a dairyman could. I built a house that cost me \$100.00. The first week we tested I made twenty-eight pounds more butter than we had been making before in the same length of time; and I found that it was quite an improvement and that we made a more uniform butter when we used the separator. We furnish about one hundred and twenty-five pounds a week and get thirty cents per pound for it. I think the separator is the thing for the dairyman.

Mr. Roberts. May I ask what kind of separator he uses?

Mr. Isenhour. I use the Alpha and find it very satisfactory. One day my separator got out of fix and I had to take it to town to get it repaired. I stayed a little late and didn't get back in time to churn that morning, and by letting the milk set till afternoon we lost two pounds of butter from that one milking. I told my wife we would try an experiment and by that experiment we lost two pounds of butter.

Mr. Johnson. My son who operates my separator is not present to day, but will be here to-morrow morning. He can tell you all about the separator and I will only be to glad too have him mention it.

President Plumb. If there is nothing more we will now hear what Dr. A. W. Bitting has to say on "Tuberculosis."

TUBERCULOSIS.

BY DR. A. W. BITTING.

Mr. Chairman, Gentlemen and Ladies:

This is one of the delightful subjects upon which to talk, especially to an organization which has for its object the making of a choice food product. It is a subject, however, that must sooner or later engage the attention of every dairyman as one of the requirements of every food is that it be healthful. All other qualities must be subservient to this one.

Tuberculosis is a subject of very great importance. It is causing more discussions than all other diseases of the domestic animal. Some of the eastern states and some foreign countries are making strenuous efforts to stamp out the disease. The newspapers and agricultural journals are devoting much space to its

discussion every week. Why? Because tuberculosis of our domestic animals, especially cattle, and consumption in the human family are the same disease. It is for the purpose of setting forth clearly what is known about this disease and to correct some of the numerous impressions made by prejudiced or not well informed writers, that I wish to speak.

Tuberculosis is the most prevalent disease of the human family. It is moreover a disease of our domestic animals, especially cattle. The disease is produced by a minute plant organism, the *Bacillus tuberculosis* and is contagious, as the germ may be conveyed from one animal to another, from one person to another, or from animals to people and *vice versa*.

While it has been known for a good many years that the disease could be conveyed from one person to another, it is only of recent years that the cause of the disease has been known and that the disease of animals and man were the same and that the disease could be conveyed from the former to the latter. The disease is not amenable to medicinal treatment and as it is contagious the means to be employed is preventive; if conveyed through food from a diseased animal, then the cessation of using such food. The old idea of the cause of tuberculosis is that it was transmitted by heredity or produced by unsanitary surroundings. No one disputes these as being predisposing factors, but they are not the immediate cause. Diphtheria and measles are universally recognized as being produced by a germ and are contagious. Tuberculosis differs from these diseases in its contagious character only by being much slower in development, often being weeks, months and even years from the time infection occurs before the unmistakable symptoms are recognized. As the science of medicine has demonstrated beyond a doubt its contagious character, there is a demand for the usage of milk and meat from healthy cattle.

Tuberculosis among cattle is a very prevalent disease in some places, but less common in others. In Denmark for example, the average number affected in six provinces is 35.4 per cent.; Holland, 20 per cent.; Paris, 6 per cent., and Belgium, 0.4 per cent. In Massachusetts, 16 per cent. of the cattle tested with tuberculin showed disease; in Iowa, 14 per cent. and in this State, 2.2 per cent. In this State the disease has been observed at Asherville, Brunswick, Dana, Evansville, Franklin, Ft. Wayne, Greencastle, Indianapolis, Kokomo, LaFayette, Lebanon, Muncie, New Albany, Noblesville, Rensselaer, Richmond, Rushville, Terre Haute, Vincennes and Warsaw. Thus you see the disease has a general distribution over the State.

The disease in the domestic animals is not generally recognized. The symptoms are not characteristic and vary greatly, as so many organs may be invaded. When the lungs are invaded the disease usually begins with a rather slight, short, deep cough. These are not frequent and more often occurs as paroxysms when the animals first get up after feeding. Gradually the cough becomes more noticeable, it is harsher, deeper and more painful. The animal becomes susceptible to changes in temperature and shows the effects of exercise. Thus far the symptoms are likely to escape attention unless close observations are made as the eye is clear and the animal eats heartily. As the disease advances these symptoms become more marked, the eye is dull part of the time, the coat loses its lustre, becomes

somewhat bound, breathing is harder, easily exhausted, animal becomes thin in the neck and behind the shoulder blade, there will be irregularity in the feeding and in the flow of milk and pressure along the ribs may provoke pain. The animal gradually gets thinner and poorer although the appetite may be fairly good. It is remarkable how far the disease may progress if the animal is carefully handled and in good quarters before the symptoms are commensurated with the lesions produced.

If the disease affects the bowels the symptoms most prominent are the irregularity of the feeding, attacks of bloating, suspended rumination, diarrhoea, constipation, a temporary ravenous appetite or mincing of food, are present at different times. The animal is a hard feeder, gaining for a few weeks and then suddenly losing all that has been gained. The animal is said to be out of condition, but you "can not place your finger on the trouble." A cessation of flow of milk, a tucked up appearance and general emaciation follows.

These are in brief the symptoms. The case will linger from a few weeks to years. The disease is spread from one animal to another by the discharges, as the mucous from the nostrils and the product of the cough. If the disease is in the udder, the calf may acquire it through the milk. The recent experiments made in Denmark show that only a few of the calves have the disease through heredity and that if they are at once separated from the mother and given wholesome milk they will remain healthy. The disease rarely makes its appearance in a single animal in a herd, unless it has been introduced by purchase. First one animal will be affected and be so bad as to die or be sold, a few months later another, and so on, so that several animals are likely to be found on the same premises in the course of a few years. The disease is one likely to be found in certain families of dairy cattle more than in others. If a herd is free from disease there should be great caution exercised in introducing new animals by purchase from herds in which there might be any suspicion, as one diseased animal may be the means of infecting several others.

As the disease is so difficult to detect by purely physical means, I wish to call your attention to the tuberculin test. This test may be used at almost any time and is almost infallible, the percentage of error being very small. The test consists of first registering the temperature of the cattle every two hours during one day to determine the normal temperature, then make an injection of thirty drops of tuberculin and again register the temperature on the following day on the corresponding hours, to determine whether a rise of temperature occurs or not. If there is a steady rise of temperature, followed by a gradual fall, the disease is present. The accompanying diagram will show clearly what I mean. We begin taking the temperature at six o'clock in the morning and take temperatures every two hours until ten o'clock at night. At that hour the injection of tuberculin is made with a hypodermic syringe. The place selected is usually over the shoulder blade. The animals are then let alone until six o'clock the following morning and then temperature again taken until ten o'clock at night. If the disease is present we will expect a gradual rise of temperature to begin at about ten o'clock and continue until two or three and return to the normal by six. This may occur earlier or later. A very short, quick rise and fall does not indicate disease.

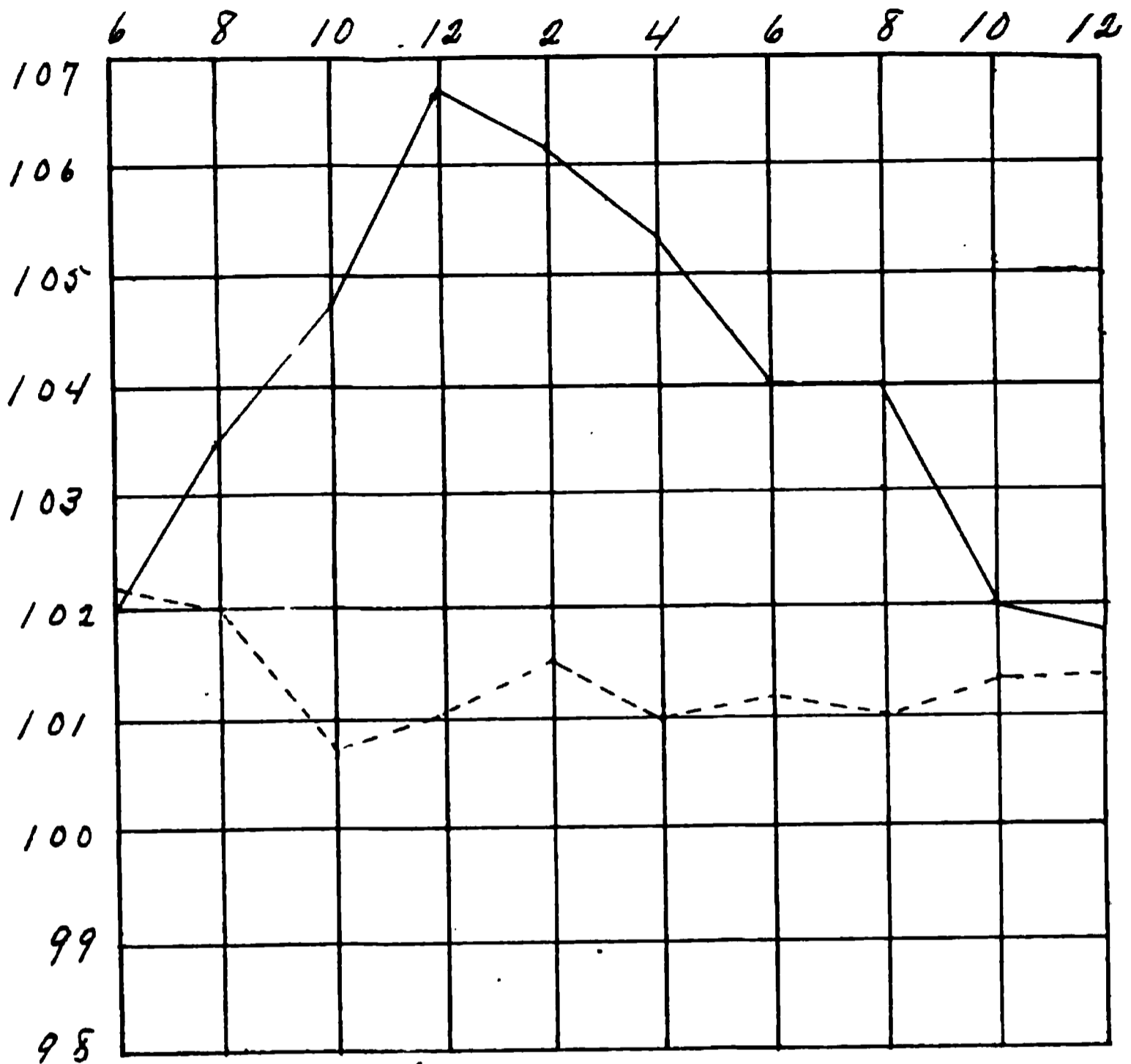


Diagram Showing Tuberculin Reaction.

The numbers in the left hand column indicate the degree of temperature. The numbers across the top indicate the hour, beginning at six o'clock in the morning. The broken line is the normal temperature. The solid line is a reacting temperature after injection with tuberculin.

This rise in temperature is not proportional to the extent of the disease, as a mild form is likely to produce a high elevation of temperature, and a very bad case, in exceptional instances, may not respond at all.

In all suspicious cases I would recommend the using of this test.

I do not believe in raising any unnecessary alarm about the presence of the disease in this State. I believe we have much less than they have in many other places. It is a disease which has a tendency to spread and the dairyman should make himself familiar with its symptoms and of the methods of stamping it out. We have just published a bulletin upon the subject which deals very much more exhaustively with the subject than time would permit presenting here, and this bulletin will be mailed to you if requested.

DISCUSSION.

President Plumb. Is there any one who would like to ask Dr. Bitting some questions about tuberculosis?

Mr. Roberts. How does it affect the udder?

Dr. Bitting. The disease first appears in the udder as a thickened or hardened tissue, it then assumes the form of a caked udder, and may, finally, become a large abscess. It may destroy a quarter or a half or the whole udder. One of the characteristics of such tumors is that they are not painful.

Mr. Fry. About four years ago I bought a cow that was shipped from Illinois and she would bloat. I got so disgusted with her that I was afraid she would die, so I got rid of her. She was brought from Illinois to the stock pens and I have never heard what was the matter with her.

Mr. Benjamin. From what source is tuberculin derived?

Dr. Bitting. Tuberculin is obtained by growing the germ (*Bacillus tuberculosis*) in bouillon for a number of weeks. These germs are then filtered out and the liquid sterilized and concentrated until fit for use. The production of the material is necessarily a very careful process. The tuberculin contains no germs, is sterilized by heat, and therefore can not produce the disease when injected into the animal.

Mr. Woods. What is the cost of testing a herd?

Dr. Bitting. It depends on the number of animals tested.

Mr. Woods. We will say twenty-five or thirty head.

Dr. Bitting. The tuberculin to test twenty-five or thirty head would cost about \$3 and the services of those who performed the work. The tuberculin can be obtained from the Pasteur Vaccine Co., Chicago, Ill.

Mr. Woods. Can anybody do the testing?

Dr. Bitting. It requires more experience than is in the hands of most people. I would advise employing a veterinarian.

Mr. Smith. If our herd should become diseased, how are we to get assistance?

Dr. Bitting. I do not know of any special manner of getting assistance at the present time. We have tested over 300 cows to get data which we desired. We do not contemplate continuing the tests.

Mr. Levering. The State Veterinarian will go and examine any herd that is supposed to be sick. If any party claims that his herd is affected with tuberculosis, the State Veterinarian will go there and investigate that case. It has been hoped that the Legislature would make arrangements whereby all herds might be tested. It is just and right that they should test all dairy herds especially. At Fort Wayne, complaint was made and the Commission went there and tested a herd and killed several animals. The man that owned this herd sued the Commission for \$20,000 damages. He said that it hurt his business; that everybody was afraid to use his milk and butter after that. You can readily see that if we go to a herd and find an animal affected with tuberculosis, and other dairymen around get to hear it, they will use it to hurt your business. But if you have your herd tested just say nothing about it and see that persons who are likely to tell it never know it. Out of as many as forty animals there may be one or two

affected, and if the neighborhood gets hold of it they will very likely quit using your milk. In regard to the cost of the work, Dr. Bitting has told what it would cost. The State would not care to send some one to examine unless you knew your herd was affected; but if you had succeeded in finding out for sure that it was affected and notify them, then they would come.

Mr. Johnson. The dairymen of our place are relieved of the responsibility with the dairy cattle. The city ordinance at Indianapolis has charge of all the dairies or any one who sells milk within the city limits. There is a dairy inspector appointed that inspects all herds that are thought to be diseased, whether with the tuberculosis or not. If any are found to be affected they are turned over to him and disposed of according to the ordinance. So we have no responsibility in that line.

President Plumb. Please tell how the farmers regard the test in the East.

Dr. Bitting. The way in which the farmers regard the tuberculin test in the Eastern States depends largely on how the work is done. If done by careful men, with evident desire to do good, the test has met with favor. In Vermont last year the Commission tested 14,155 head of cattle, killed 924, and only made four mistakes. This testing was all done at the request of farmers and was made public. In some sections of Massachusetts the test is regarded as being all right, in other parts where unskilled men are employed and mistakes are constantly being made, it is regarded as a farce. When the test is made for the benefit of the owners, and as a protection to public health, there is no objection raised. If I were to make the test in this State I should make it public and give a certificate for all animals that did not react. I believe that it would be profitable for some dairymen near all the larger cities to have their herds tested and sell their milk as from herds free from the disease.

President Plumb. Why is there a less number of cases in Indiana than in some of the Eastern States?

Dr. Bitting. The disease has never been spread in Indiana like it has in some of the Eastern States. If you find a locality which has at one time had tuberculosis you will find a large amount of it. If it has never been introduced, there is none present. Moreover, the disease is produced in the East quite largely by the sanitary surroundings, and the barns are of such close character as a rule that they tend to spread the disease. That is a very important part in Denmark. The barns are very close, dark and unhealthy.

Mr. Johnson. What breed, if any, is most subject to the disease?

Dr. Bitting. There is no difference that I know of.

Mr. Fry. Are all animals that show this disease unfit for breeding purposes?

Dr. Bitting. There are quite a number of experiments, indicating that they may be kept especially for breeding purposes. But keeping the animals when they show that they have tuberculosis may cause the disease to spread among the rest of the herd.

Mr. Benjamin. What is the effect upon the milk?

Dr. Bitting. The effect of the disease upon milk is shown only by the effect the milk has upon the ones who use it. It is possible to transmit the disease from the animal to man.

Mr. Fry. There has been a tendency to overestimate the dangers of making butter from cows affected with tuberculosis. The tests of milk are so thorough that but a very small proportion of the people who have tuberculosis get it by using milk and butter. There is a greater and larger number that get it by using the meat of animals affected with the disease. It is said that 90,000 people in England died from that disease alone. But if the disease is located upon internal organs I think the meat may be used with safety if it is cooked at a high temperature.

Mr. Hoadley. Explain in regard to the caked udder. When does it indicate the disease?

Dr. Bitting. There is no way of telling whether the cake in the udder is caused by tuberculosis or other diseases of the udder. The only way you can tell is by the discharge from the udder.

Mr. Hoadley. Is there a discharge at other times when there is not that feeling of pain?

Dr. Bitting. Yes.

Prof. Latta. Have you anything upon the program relative to the influence of the barn upon the disease? I heard an eastern man in regard to the relation of the barn to the disease: This man was Professor Brooks, of Massachusetts, and he came to our station in search of animals that were free from this disease. I asked him: "How do you account for so much of the disease in the east? Isn't tuberculosis becoming more and more intense in the northeast, and how do you explain it?" He stated that in early days their barns were well opened and the cows stood in sheds and there was an open passage clear up to the roof of the barn, and the manure was cleaned out every day. A little later they found by closing up the barn a little they could save some of the feed. That was found to save some feed and they were not slow to take the time to make the barns tight. They closed the openings, made the barns tight and dark and didn't remove the manure quite so often, and the result was to greatly increase the tuberculosis. The filth of the barn will at least harbor the germ.

This shows the relation of cleanliness and good ventilation in Massachusetts to good, sound, healthy animals.

President Plumb. We have exhausted all the time we have for that subject and we will now hear Prof. W. C. Latta, of Purdue University Experiment Station, on

DAIRYING AND ITS RELATION TO SOIL FERTILITY.

BY W. C. LATTA.

All life has its physical basis in the soil. The plant feeds upon the soil, the animal subsists upon the plant, and hence all life is dependent upon our nourishing mother earth. The question of soil fertility is, therefore, one of perennial interest to all the human family, and it is of the greatest economic importance to the husbandman.

Sad experience has shown that soil fertility may be speedily reduced below the limit of profitable production of crops. The improvident methods of the pioneer farmer have so reduced the soil fertility and the profits of agriculture as to force upon every thoughtful tiller of the soil the conviction, we must care for the soil.

It is a comparatively easy matter to restore and maintain soil fertility, if one has ample means or time at his command. Money will buy fertilizers and time will effect a renewal of the soil; but the every-day farmer, who must make a living as he goes along, has neither of these means at his command. How shall the farmer, while making his living, so conserve the soil resources as to obtain profitable yields from year to year?

The persistent growing and selling of grain and hay, without making returns to the soil, must inevitably result in failure. How shall we make restitution to mother earth for the heavy drafts she has honored at our hands? I know of no more effective or profitable way to restore lost fertility and increase the productiveness of the soil than to engage in dairy farming.

Our most intelligent farmers clearly recognize the necessity of concentrating the products that leave the farm as a means of reducing the losses to the soil. In dairying the policy of concentration is carried out in the highest degree. The milk dairyman sells a highly concentrated product, and the man who sells cream carries this concentration one point further, while a triple refinement and concentration is effected in the making and selling of gilt-edge butter.

It is well understood by all physiologists that all the fertilizing materials of the feeding ration which do not appear in the milk are recovered in the manure. In order that we may appreciate more fully the enormous saving in soil fertility that may be effected in dairying, let us take an example of a 100-acre farm and compare the losses in soil fertility that would occur if the crops were sold with the losses that would be involved in dairy farming. We will assume that the 100-acre farm is subject to a five-course rotation, as follows: Twenty acres each of corn, oats and wheat, and forty acres of meadow and pasture. We will assume that the corn yields fifty bushels of grain and two tons of stalks to the acre; that the oats yield forty bushels of grain and one ton of straw to the acre; that the wheat yields twenty-five bushels of grain and one ton of straw to the acre, and that the meadow and pasture yields two tons of hay, or its equivalent in grass, per acre. We will assume, further, that the cows average one thousand pounds in weight, yield on an average of three hundred pounds of butter per annum, and consume daily twenty-five pounds of the food products grown on the farm, exclusive of the wheat straw, which may be used for bedding. We will assume, also, that it takes twenty-five pounds of milk to make one pound of butter, and that the cream is ten per cent. in weight of the milk. A little calculation shows the total amount of food produced on the farm and the amounts of milk, cream and butter that might be produced from these foods, to be used as follows:

FOOD AND ITS EQUIVALENT IN MILK.

Total food	200 tons
Milk	328,500 lbs.
Cream	41,062.5 lbs.
Butter	13,140 lbs.

When we remember that over eighty-five per cent. of milk is water we can see that an enormous concentration of the food is effected by converting it into milk, and that a still more marked concentration is effected by the selling only of cream or butter. The foregoing figures do not tell the whole story, however, as the above named products vary much in chemical composition. Attention is therefore called to the following figures, giving in pounds the elements of plant food which they respectively contain:

FERTILIZING INGREDIENTS IN FOOD AND DAIRY PRODUCTS.

	Nitrogen.	Potash.	Phosphoric Acid.
In 200 tons food	6,688 lbs.	4,533 lbs.	1,920 lbs.
In milk.	1,741 lbs.	591 lbs.	624 lbs.
In cream	164 lbs.	53 lbs.	62 lbs.
In butter	16 lbs.	5½ lbs.	5½ lbs.

The above figures show conclusively that an immense saving of soil fertility can be effected by converting the food into milk, cream or butter. The cash value of the fertilizing ingredients in the crops and dairy products of this 100-acre farm are as follows:

In crops	\$1,610 20
In milk.	392 56
In cream	37 08
In butter	3 52

The foregoing figures are, of course, not absolutely correct, but they are believed to be close approximations to the exact truth.

In view of the fact that many, if not most, dairymen reinforce the farm products with other concentrated feeding stuffs which have both a high feeding and fertilizing value, we see at once that in dairying it is possible to prevent any considerable loss of soil fertility. Under the most intelligent and careful methods of husbanding the manure and returning it to the farm, dairymen can effect an improvement in their soil from year to year. It is possible, therefore, to maintain the soil fertility indefinitely upon a dairy farm, but it will be well to remember that even in farm dairying very considerable losses of soil fertility will occur unless the most careful methods of saving and utilizing the manure are pursued.

DISCUSSION.

Mr. Woods. I have been very particular about saving all the fertilities. I drive the wagon in once a day and load it all up. You will find that this kind of fertilizer is far better than any you can buy.

Mr. Roberts. Would land plaster be beneficial to use?

Prof. Latta. I think it might be good.

Mr. Stubbs. Mr. Chairman, I just want to ask Mr. Latta where he would place cheese in his table.

Prof. Latta. The cheese isn't in it. (Laughter.) I didn't look up that question, as we are not a cheese-making people. We do not produce much cheese, and I don't know just why, unless it is because it does not pay us to make it. But I presume it would rank with milk.

Mr. Roberts. How much is skimmed milk worth per 100 pounds to pour it on the ground?

Prof. Latta. It depends on where you pour it. If you pour it in the street it would not amount to anything, but if you pour it in the field it is of course worth something. The skimmed milk is very rich in plant food matters, and especially in albumen. It is better than some would imagine.

Mr. Roberts. Has it much value to pour it on the ground?

Prof. Latta. No.

Mr. Benjamin. Would you recommend the use of land plaster or other fertilizers of that kind on soil that is not accustomed to it? Don't we have to keep it up if we begin it?

Prof. Latta. I would not recommend it.

Mr. Benjamin. In the Eastern States they are using something in the place of manure. If we have come to that subject I want to say that there is nothing that is equal to manure.

Mr. Johnston. How do you save and apply farm manure?

Prof. Latta. I had the pleasure, recently, of hearing a paper read by Mr. Terry stating his method. He has put in a cement floor in his barn and every drop of the liquid portion of the manure is saved. From the floor it is turned directly to the fields and scattered upon the fields as it is turned out. We want to get it upon the lands at the earliest possible moment, and over fields that have vegetation upon them. With stables that have tight floors you can save the liquid manures and you can spread at once and I believe you can get more value out of it in that way. Some prefer storing and rotting their manure in the stables, but I had rather have the rotting go on in the soil than outside of it.

Mr. Johnson. At times in the year you can not draw out this manure on account of its being frozen hard. You might store the manure in a tight place, but don't keep it packed down. Keep it so the air can pass over it. It will not heat if you keep it so it is not packed down tight. I have been contemplating building such a house to store my manure in, in winter, and apply it in the spring just before time to begin our plowing. If you pile it out and let it become frozen it is a hard thing to handle, but by putting it in the building you can handle it at any time during the winter.

Prof. Latta. If I were following the same method of farming as Mr. Terry is I would do that, too. You could do better than Mr. Terry. You could grow corn. He can not apply the manure until after he harvests his crop of wheat, and he must preserve it the best he can until that time. Now if you are following a system that will prevent you from putting it at once on the field, do as he does.

Mr. Stevenson. He lectured twice in our State here, and he gave us a history of how he managed it. He told us to draw the manure directly from the barns and into the fields.

Mr. Benjamin. Take it when there is snow on the ground or the ground is frozen and we have a snow, and there comes a thaw, don't we get more from it then by spreading it a little?

Prof. Latta. In a very short time about 50 per cent. of the value is washed out of it, perhaps before it gets into the fields at all. For our level lands I believe we would not make a mistake by putting it on the fields. If our lands are level there is no danger of wash.

Mr. Woods. I am satisfied that by spreading the manure on the frozen ground that it will get off, and sometimes it will get off of a fellow's field entirely. I tried that and I found it going off into another fellow's marsh. Where it drains off on our own fields it is all right; but when it comes to getting into other people's fields I am not in for it. (Laughter.)

Mr. Moore. Mr. Chairman, I want to say this: I handle my manure in this way: I built me a barn 80x82 feet that I let my cattle run in all winter. I never removed a particle of manure from that barn until I got ready to break ground. I bed every day, and my barn is thoroughly ventilated. This is a plan of our own, but I have had first rate results in this way.

Prof. Latta. Are they beef cattle?

Mr. Moore. No.

Prof. Latta. When our cattle can run in that way it is recognized that it is the proper thing to do. Then wait your chance for getting the manure out in the fields. But every one has a way of his own, so I will leave that to your judgment.

President Plumb. We will now hear the report of the Auditing Committee.

Mr. Levering read the following report:

To the Indiana State Dairy Association:

GENTLEMEN—Your committee to which was referred the auditing of treasurer's books respectfully report they have examined the accounts of the same and find vouchers for each expenditure, save one from Mr. Ellison, which Mr. Ellison promises to furnish. The accounts are found correct.

Respectfully submitted,

C. B. BENJAMIN,
MORTIMER LEVERING,
Committee.

Moved by Mr. Levering, seconded and carried that this be spread upon the minutes.

Mr. Woods. I move that we appoint a committee on resolutions.

The motion being seconded, it was carried by a vote of the house.

President Plumb. I will appoint the following committee, to report before the close of the convention: Frank P. Johnson, Chairman; Sam B. Woods, Ed. Sudendorf.

President Plumb. We will now go back to the subject we omitted in the forenoon, and hear Mr. O. A. Stubbs talk about

THE CREAMERY FROM A PATRON'S STANDPOINT.

BY O. A. STUBBS.

The advent of the butter and cheese factories has not given in all cases the relief to the man whose farm was mortgaged that was promised by the manufacturers of creamery supplies and depicted by their smooth and sleek-tongued agents; however, they accomplished their object and established factories in a great many localities throughout the State.

We do not wish to be understood that these factories are a nuisance, but the contrary. The trouble is we were induced to pay two or three times the real value, causing dissatisfaction to start with.

We were ignorant in the way of producing milk and the proper management of the cows to secure the most profit and in the management of the factory. Consequently we have many closed factories among those who started under apparently favorable circumstances; some were brought to a standstill through the misunderstanding of some stockholder.

Our State being purely agricultural, it takes some time to place enough of our land in grass to support cows enough to supply the milk for these factories.

This change devolves on the patrons, and on them the success or failure depends to some extent.

I presume there is not a farm in our State but has one or more cows, and with every intelligent farmer the question of profit and loss should be frequently discussed.

In localities where there are butter and cheese factories it is undoubtedly the best for the farmer to patronize them, the cost of delivering the milk being considered. We know that the market for country butter is always glutted. Our little villages consume only a very few pounds per week, and, owing to lack of uniformity in color, condition and flavor, the product can not be shipped profitably to any market where it will have to compete with prime butter. When this so-called "butter" is taken to the country store it is there bartered for a few groceries or articles of apparel, the proprietor acting as though he was making a present of them. If the milk from which this butter was made had been taken to a factory and bought by the test, the patron would not only have received cash for his butter, but more of it. Here it is manufactured into an article uniform in color,

flavor and grain. and when it is placed on the market commands a price which will enable the patron to keep good cows at a profit. I would place the care of milk at home, and the loss in skimming and churning against delivering the milk to the factory, which in many cases does not equal the trouble at home.

Many of our factories are losing money by not having enough milk per day. It takes the profit on what is received for running expenses, when if they received three or four times the amount they do and ran to the full capacity of the factory, they could pay the patron much more for his milk and the running expenses would not be materially increased. It seems to me this is a point that the patron should look after; yet, I would have the patron and factoryman one and the same person, that is, they have a mutual interest, when run on the co-operative plan, and if harmony prevails, it is without question the best way to run a factory. The patron of such a factory seeks not only his welfare, but that of his neighbor also; he will not try to share the profit of his neighbor's good cows without making an effort to have better ones himself and give them the care they should have. If he has nothing but scrub stock, he should at least place at the head of his herd a pure bred sire of one of the milk and butter breeds. In the calves, when they become cows he will, as a rule, find great improvement over his previous herd. These must be fed by a liberal hand with a balanced ration. That is, a ration which contains in the right proportion the elements out of which the cow can manufacture milk and load it with fat butter.

The average patron of our butter and cheese factories in this State does not see enough profit in the business to properly equip himself for the work. At our factory we do not have a patron who has a silo and but about six who have over ten cows; the average being nearly four cows to the patron.

In most cases the farmer has added the dairy to his regular farm work as a means of converting his rough feed into an article of merchandise, and in doing this, he has made discoveries to which, if he gives especial attention, will bring about wonderful changes in farm economy.

The patrons of our factories who have good cows and care for them in the best possible manner and provide for them a properly balanced ration, have only received half the profit they should.

There is not an animal reared on the farm which will give as good return as the hog, when fed on skim milk, to which has been added a small quantity of oil meal or shorts. We know by experience that pigs can be made to weigh from two hundred and fifty to three hundred pounds at six or eight months old when fed on creamery swill, oil meal and corn, with the run of good clover.

Young calves will make good growth when fed on skim milk to which oil meal has been added. 'Tis true they need additional feed, such as clover hay, bran and crushed oats. We think calves dropped in the fall are less trouble to feed the skim milk which comes from the factory, because milk will keep sweet at this season of the year much longer, when in summer it is not fit to feed young calves by the time it reaches the stable.

Poultry will also return a good profit if fed on skim milk.

In the use of the by-products of the factory the patron should count on more than just the feeding value. They tell us that a very large per cent. is digestible

and that they also possess a manurial value. This is not only true of skim milk, but all feed; the more concentrated the feed the more fertilizing elements it possesses.

They tell us also that there is not an animal fed on the farm that will help us retain the fertility of the soil as well as the cow. So in conclusion I would advise the farmer to patronize the butter and cheese factory. Furnish all the good milk you can from as many good cows as your farm will support.

Feed all the pigs on skim milk and let nothing go to waste; have stock to consume and assimilate all the by-products.

Arrange your stables so that you can care for all the manure, both liquid and solid.

Remember that the cow is a manufacturer of no uncertain character. She is sensitive to cold, has feeling, and if ill treated or fed, will kick something out of your pocketbook.

Keep an account with your cows and if they are good ones you will find that during the year you have done more cash business than ever before.

DISCUSSION.

Mr. Roberts. Mr. Chairman, we have been operating a creamery for about six years. It took all the money we had to make it pay in the first place. An Indianapolis man bought it and it is running yet. They are running it on the co-operative plan, and we all know butter has been cheap this year. We are only a little over a half-mile from the creamery. We milk, generally, about forty cows, and they are making us a better return than anything we have had hold of yet. Take the right man with the creamery and it pays.

President Plumb. Do you use the Babcock system of testing?

Mr. Roberts. No. We use the Northfield (?).

President Plumb. Who will tell us the benefits they have received from the Babcock test?

Mr. Stubbs. We use the Babcock test. We also bought of Davis & Rankin. No one man was allowed to have more than four shares of stock. We have been running six years, the 19th of next May. We started it with a buttermaker and a secretary and we have them to-day. That is something I don't believe any one else can say. We have always declared a dividend, and I don't believe there is another creamery in the United States that has declared so large a dividend as we have. We have bought on the Babcock test since it began. We bought for the first year or two for so much a hundred. It has enabled us to do more business on a cash basis than anything that has come to our place.

Mr. Roberts. The storekeepers can tell when pay day comes at the creamery. Everybody claims that it leaves all the money at home. It pays \$15 or \$16 per month right in a circle for ten miles around. In our town we were touched up with the Davis & Rankin Creamery. We started to run it and we paid our secretary too much money and we had to borrow money, and those who borrowed the money (I was one that helped to do it) had to finally sue to get our money, and we

got the creamery. There is no doubt but what there should be money made out of that creamery. We ran from 3,000 to 5,000 gallons of milk a day when we did run. If some man could get hold of it and manage it right I think there could be some money made there. I would have tried it but I have something at home better than that. I have two big springs and the water is drawn under my spring house by hydraulic pressure. I get thirty cents and forty cents per pound for my butter the year round. But if I should take hold of this creamery I could make it pay, sure.

Mr. Echterling. We have a creamery at our place, and last year they declared a thirty-eight per cent. dividend. I thought it was too much. There was about twelve or fifteen outside shareholders that didn't bring us any milk, and they have been getting the same benefit as the farmers who bring the milk. This year they put it down to twenty per cent. and I think it is still too high.

President Plumb. Do the patrons find the creamery a benefit to them?

Mr. Echterling. Yes, and they only bring a little milk and prefer a high dividend.

Mr. Woods. What is the actual cost of equipment for running a creamery to make a reasonable amount of butter, and do they charge by the butter or by the test?

Mr. Echterling. About \$2,500. They charge 3½c for each pound of butter; this covers all expenses.

Mr. Gardner. Mr. Chairman, I have presented my dollar to become a member of this organization, and I wish to say I am in the creamery business, and to the last question that was proposed I could say yes, and know that I am right. I am located at Wabash, Indiana. We have been enabled to learn a great deal about the creamery, and there is nobody in our place that thinks it a nuisance. We can't expect every one to see alike, but they seem to all think that the creamery is a good thing; but sometimes one will build up a private dairy. There should be just as good butter made at a private dairy as at a creamery. If anything, the private dairy has a little advantage over the creamery; it can get the kind of milk it wants; a man in a creamery has to take just what he can get. You can educate the people in a reasonable time, but you will have a hard time doing it. They don't take all the pains with the milk that they should; some will bring milk in a perfect condition; others out of condition, and while you have the good milk, the poor milk that is brought in brings the good milk down to a standard with the bad milk.

We have had a creamery five years last June. Mr. Stubbs said he did not believe there was another creamery to-day that had the same men that it had when it started up. I am a druggist, but I went into a creamery on account of my poor health. I have the same boys to-day, with the exception of the buttermaker, that I had when I started up. I am the buttermaker now. I am secretary, treasurer and buttermaker; as the old saying goes, I am chief cook and bottle washer. I went in it without any experience; and now and then during three years' time, I learned buttermaking; and now I occupy the four positions of manager, buttermaker, secretary and treasurer. We have some who are perfectly satisfied with the results that they get from the creamery. I believe that if every farmer would

subscribe for "Hoard's Dairyman" they would all become perfectly satisfied with the business. They would either start a creamery or private dairy—which is equal if not superior. If a man would listen to what Mr. Latta has given us here; if we could get the farmers to believe that, they would see that dairying would be the most profitable business that they could follow. But they come to me in this manner, and they say "what do you know about it?" I say a man does not have to be raised on a farm to know some things. I take "Hoard's Dairyman" and I read it. "Hoard's Dairyman" is my guidepost. I have had some experience on a farm. I lived twelve years on a farm, fifteen years in a drug store, and five years in a creamery; and I think the creamery business is the most elevating business a man can follow. Farming is the least elevating and dairying is the most interesting.

In speaking of the building up of a creamery, I will not tell you who built our plant, but they paid for it before we started it to running. We started with fifty-two gallons of milk the first day. We have had as many as 152 patrons bring us milk in one day. But I notice those who started in when the creamery started, gave the best satisfaction and are making money. They draw their money every month; and they have the cash at the end of every month, instead of drawing the money twice a year.

I would like for some member of this Association to suggest to me a plan whereby I could get my patrons of the creamery most interested. I know of no better way than to present my patrons with a copy of "Hoard's Dairyman" and have them read it.

Mr. Stubbs. We usually hold what we term monthly meetings. We started the farmers to thinking in that way. We consider all kinds of farming, but the creamery department seems to be of the most importance. This seems to interest our patrons more than any one thing.

President Plumb. If there is no further business we stand adjourned to meet at 7:30 to-night.

EVENING SESSION.

Meeting called to order by President Plumb. After several numbers of excellent music, the President delivered his annual address, which was on

THE PAST HISTORY AND PRESENT STATUS OF DAIRYING IN INDIANA.

BY C. S. PLUMB.

It is my desire this evening, to direct your attention for a time to a consideration of the importance of the dairy interests of Indiana in the past, and to offer some comments on our prospects and work for the future. It is well for us all to occasionally survey the past, hoping therein to find lessons or encouragement for the future.

Indiana has never been recognized as a prominent dairy State and is rarely referred to in that connection by dairy writers or statisticians. In the early history of the State, milk, butter and cheese were regarded as unimportant farm products and little attention was given to their commercial production. Wheat, corn, beef cattle, sheep and pigs from the beginning held the attention of the farmer. In 1852 the first annual report of the State Board of Agriculture was issued, which consisted mostly of reports from county agricultural societies. Here we find that Elkhart County reports there is not a regular planned dairy in the county and that butter sells at "from 6 to 10 cents during the summer and fall; in the winter it brings a trifle more." In the annual report to the State Board, the Marion County society barely makes reference to dairy products, although to-day this is our leading dairy county. In Monroe County, "but little attention has been given to making butter and cheese. We have no dairy establishments, the low price of butter furnishing no inducements to invest capital in them." The report from Porter County gives the yearly produce of butter per cow from 90 to 100 pounds, with the average price for the season of 12½ cents. In Wayne County, the average yield of butter per cow was believed to be about 100 pounds and of cheese 200 pounds. The average price of the butter was 12 cents and of cheese eight cents. From the other counties the reports either made no reference at all to dairying, or else gave the subject the briefest attention. This report of over forty years ago, gives us a fair conception of how the people of the State regarded this industry. In 1856 an agricultural report was published that in general character would be a credit to the State if issued to-day, forty years later. It is interesting to note that comprehensive statistics are given from the books of township assessors of each county, showing the amount and value of agricultural produce. Statistics are given of horses, mules, asses, cattle, sheep, swine, pork, bacon, lard, poultry, wool, wheat, corn, rye, oats, potatoes, barley, grass seed, hay, hemp, hops, tobacco, orchard products, market gardening products, maple sugar, wine and home made manufactures, but no reference is made to the insignificant articles of milk, butter or cheese. Perhaps they are included in the item of "home made manufactures." I notice, however, that at the fifth annual fair held at Indianapolis, in 1856, four silver prize cups, valued at \$10.00 each, were given different exhibitors of butter, while three \$10.00 cups and one \$20.00 one were awarded to exhibitors of cheese. Thirteen prizes were awarded on butter and cheese shown at the State Fair that year. Notwithstanding this, the dairy industry received scant recognition, and the numerous county reports show but a slight amount of butter and cheese made at that time. In Allen County, "enough butter and cheese to supply the home demand," is reported made. In Lagrange County, but little attention was given to the dairy, "further than is necessary for family consumption." In Wabash County the dairy products are reported as respectable in quality and quantity. Some of the butter and cheese on exhibition at the fair, it is said, would be creditable to any dairy region.

In spite of what has been said, however, according to the United States census, among the Western States, in early days, Indiana did not make such a bad showing as a butter producer, although in cheese production we have always ranked too low. In 1850, of all Western States, Indiana ranked second in butter production

making twelve million pounds to Ohio's thirty-four million pounds. Indiana, however, made but some 300,000 pounds more of butter than Illinois. In 1860, of thirty-four States, Indiana ranked fifth in butter production. New York led with 103 million pounds, being followed by Pennsylvania with fifty-nine million pounds, Ohio with forty-nine million, Illinois with twenty-eight million and Indiana with eighteen million. In ten years Illinois has made great strides. In 1860 the five leading counties in butter production in the State were the following in the order named: Allen, Elkhart, Carroll, Henry and Wayne, Allen leading with 378,858 pounds. Twenty years later, we come to the Census of 1890 and we find a marked change in affairs. New York still leads as the banner dairy State, producing 664 million gallons of milk, 113 million pounds of butter and 124 million pounds of cheese in 1889. Among 49 States and Territories, Indiana is ranked as ninth in milk production (200 million gallons), ninth in butter production (50 million pounds) and 15th in cheese production (two million pounds). In butter production the States rank as follows: Iowa, New York, Pennsylvania, Illinois, Ohio, Wisconsin, Michigan, Kansas, Indiana.

It can thus be seen that while Indiana never possessed the reputation of being a dairy State, she has in reality held a very respectable rank, numerically speaking, and this in spite of the fact that the people of the State have not looked with favor upon this industry. If an industry is not given special attention and its importance given recognition by a fair proportion of the people, it will not thrive in a manner to attract attention. In other words, it will be regarded as insignificant in character.

In our earliest agricultural literature in the State much space will be found devoted to the cereals and live stock. Forty years ago essays on Indiana corn and live stock were published in our agricultural reports that were highly creditable, comprehensive and useful for that time. And so it has been ever since. When our people assembled in agricultural conventions, corn and wheat and cattle, sheep and swine were the subjects of their discourses. They wanted to know how "to grow more corn, to feed more hogs, to buy more land, to grow more corn, etc." The last United States census shows us that in 1889 Indiana ranked seventh in the yield of Indian corn and fourth in the yield of wheat. In 1895, a poor corn year for us, we ranked sixth in the production of this cereal and eighth in production of wheat. According to the United States department of agriculture statistician, in 1895, Indiana ranked seventh in production of corn, and eighth in wheat. On the first of January, 1896, according to this same authority, in valuation of horses, Indiana ranked seventh; in milch cows, eighth; in oxen and other cattle, eighth; in sheep, fifteenth, and in swine, seventh.

So far as I have been able to learn, the dairy industry received no special recognition in this State until 1877, when an attempt was made to establish a State dairy association. Acting upon a call in the "Indiana Farmer," on September 26, 1877, a meeting was held in the exposition building on the old State fair grounds to form the Indiana Dairymen's Association. Mr. Asher Kellum, of Friendswood, was made temporary chairman, and James Stevenson, of Greencastle, temporary secretary. A committee on permanent organization, consisting of Dr.

Parker, Dr. Voyles and J. E. Thompson, was appointed, who reported the following gentlemen for permanent officers: Asher Kellum, president; W. H. Broaddus, Connersville, vice-president; James Stevenson, secretary; and J. P. Kingsbury, of Indianapolis, treasurer. At this point, I wish to call attention to the fact that Mr. Broaddus was one of the charter members of the present dairy association.

At this meeting a constitution and by-laws were adopted, and those present listened to an address prepared by Dr. Stevenson on "Dairying," which, in his absence, was read by some other person. Remarks were also made at this meeting by Messrs. Broaddus, Kellum and Voyles, and L. S. Hardin, of Kentucky.

On February 13 and 14, 1878, another session was held, this time at the rooms of the State Board of Agriculture at Indianapolis, a dozen or more persons being present. At this meeting an additional by-law was adopted, making the yearly membership fee of the Association one dollar. At the morning session of the 13th remarks were made by J. H. Reall, of New York, J. E. Thompson, Dr. Stevenson and Messrs. Ballard and Chandler. In the afternoon, Dr. Stevenson, of Greencastle, read a paper on "Butter," which was followed by a discussion. On the second day, J. E. Thompson, of Waterloo, read an essay on "Practical Dairying," which was also discussed. At night, Francis D. Moulton, of New York, delivered an address upon "Butter and Cheese" before the Association and a number of citizens at the Court House, being introduced by Gov. Williams.

On October 1, 1878, another meeting was held in the rooms of the State Board of Agriculture, thirty or forty members and others interested being present. No set addresses were made at this meeting. Again, on December 11 and 12, the Association met, and during this session the following officers were elected for the year 1879: Asher Kellum, Friendswood, president; Sylvester Johnson, Irvington, vice-president; M. S. Parker, Amo, secretary, and G. C. Stevens, Indianapolis, treasurer. The report of the treasurer, J. G. Kingsbury, showed a balance of \$1250 in the treasury. No set addresses were made at this meeting. At this time the following interesting preamble and resolution was adopted:

Whereas, It is believed that much injury results to the consumers of milk purchased from the producers or dealers on account of its adulteration and the improper food given their cows, as well as the want of protection of measurement. Therefore be it

Resolved, That a law should be passed protecting such consumers, and that the president and secretary are hereby appointed and requested to direct the attention of the members of our next General Assembly to this, and urge upon them the importance of immediate action looking to the protection of such consumers, by proper legislation.

The third, and so far as I have been able to learn, the last annual session of the Dairymen's Association was held January 13 and 14, 1880. Papers were read on "Cheese Dairying", by J. E. Thompson, on "Dairying in Indiana", by G. C. Stevens, and on the "Selection of Dairy Stock" by George Jackson. In the election of officers Asher Kellum was elected President; George Jackson, Vice-President; G. C. Stevens (Stephens), Secretary, and Fielding Beeler, Treasurer. The last three were appointed as an Executive Committee.

The annual reports of this Association were published in brief form in the State Board of Agriculture reports for 1877, '78 and '79.

Upon coming to this State early in 1890, the writer found no State Dairy Association in existence, neither was he aware at that time that any had heretofore existed in the State. As dairying was generally receiving much recognition over the country at this time, and all the older States had well established Dairy Associations, it seemed to me as though such an organization had a legitimate place and work in Indiana. So early in January, 1891, the writer prepared a personal call which was sent out to as many dairymen in the State as could be reached through the press and by personal letter. This call was signed by the writer, C. B. Harris, Goshen; D. H. Jenkins, Indianapolis; W. H. Broaddus, Connersville; Mrs. A. L. Smith, Princeton; Mrs. Laura D. Worley, Ellettsville, and F. J. Claypool, Muncie. At the meeting held on January 15, the following persons became charter members: C. S. Plumb, C. B. Harris, D. H. Jenkins, J. W. LaGrange, Mrs. Laura D. Worley, Charles Van Nuys, Mrs. Kate M. Busick, G. A. Stanton, Albert List, Sylvester Johnson, E. G. Howland, Mrs. George Jackson, W. H. Broaddus, Mrs. Calvin Fletcher, H. H. Wheatcraft, George W. Brooks, L. J. Christie, C. T. Doan, Mrs. A. L. Smith and W. C. Wheatcraft. Other new members were taken in during the year.

At this first meeting, articles of association were drawn up and the following officers elected for the year: C. S. Plumb, Lafayette, President; D. H. Jenkins, Indianapolis, First Vice-President; Mrs. Kate M. Busick, Wabash, Second Vice-President; C. B. Harris, Goshen, Third Vice-President; Mrs. Laura D. Worley, Secretary-Treasurer, and an Executive Committee, consisting of the President, Vice-President, Secretary-Treasurer, and Messrs. LaGrange and Howland.

On February 18, 1891, the first annual session was held in the lecture room of the State Board of Agriculture at Indianapolis. Eight prepared addresses were delivered, and much interest was shown in the meeting. At this session a comprehensive bill, to be submitted to the Legislature, to prevent deception in the manufacture and sale of dairy products, was read.

Since this first call to organize, the State Dairy Association has held regular annual meetings, has published independent annual reports, ranging from 60 to 90 pages, containing stenographic reports of the entire proceedings of each session, including many valuable addresses, has during two sessions of the Legislature attempted to secure the passage of bills to regulate the manufacture and sale of artificial dairy products, has given material assistance towards securing the passage of the Congressional bill regulating the manufacture and sale of filled cheese, and has in many other ways proved itself worthy of the confidence of the people of the State. After holding three annual sessions at the Capitol at Indianapolis, as the attendance was not as large as seemed desirable, it was decided to go about among the people, and try the plan of holding annual sessions in different parts of the State, where the influence of the Association would be more strongly felt by the dairy producers. Accordingly, in 1893, the fourth session was held at Crown Point, and was an unqualified success. A cordial invitation being extended from Wayne County, the next session was held in 1894 at Centerville, and a crowded house and the greatest hospitality among the people for the two days characterized

the sessions. Last year we met at Fort Wayne, but the attendance was a disappointment, in considerable measure, no doubt due to the meeting being held in a large city.

A careful examination of the reports of the County Fair Association and the State Board of Agriculture for nearly half a century will show that premiums have been awarded for exhibits of butter and cheese, and that as early as 1856 the State Board of Agriculture offered silver cups, knives and forks and spoons as premiums. The competition, however, I judge, was never severe at the fairs, as the premiums at county shows in early days were only 25 or 50 cents, or other trifling sums.

The first pronounced recognition given by our State Board of Agriculture to the State dairy interests, was through the efforts of Mr. C. B. Harris, a member of the Association, who, in 1892, was elected to the State Board from the Fourteenth District. As a champion of the dairy interests, Mr. Harris, in 1892, was appointed Superintendent of the dairy breeds of cattle and a new "department of dairy and creamery products and supplies" was established on his recommendation, of which he was also made Superintendent. Through Mr. Harris' influence, a neat dairy building was erected in 1892 on the new fair grounds, in which was placed a fine, large refrigerator, with three glass sides, capable of holding a large exhibit of butter and cheese. Not only was a new dairy building erected, but more liberal premiums were awarded than ever before in the history of the State Board. As a result of the untiring efforts of this efficient Superintendent, at the last exhibit of our State Fair was shown the finest and largest exhibition of Indiana butter ever made in this or any other State. Not only was a fine exhibit made, but a judge was appointed to pass on the exhibit who is a past master in the work, so that premiums were awarded strictly on their merits. This was the most encouraging sign seen in many a day by dairymen attending our State Fair. An interesting fact in connection with the dairy show at the fair, is that the immediate charge of the building and exhibit has always been with an Assistant Superintendent, appointed from the membership of this Association. Mr. H. C. Beckman, our Secretary-Treasurer, has for some years most efficiently aided Mr. Harris in his work.

Until very recent years, Indiana has been regarded as a State where nearly all the butter made has been produced in the homes of the people—private producers. In 1874, came the first recognized effort that I am aware of in the way of coöperative dairying*. At this time an effort to establish coöperative cheese factories in Indiana was made. One was successfully started in Porter County, and during the succeeding two years several were started in the southern tier of counties bordering on the Ohio River, with markets at Louisville and Cincinnati. In 1877 a company organized at Friendswood, Hendricks County, the first in the central part of the State. Mr. Stephens stated before the Dairyman's Association in 1879 that factories were operating in fifteen different counties of the State, there being over twenty in all. From this time there was a gradual increase in the coöperative butter and cheese factories in the State. According to the United States census

*G. C. Stephens, 29th Ann. Rept. Indiana State Board of Agriculture. Vol. XXI, 1879, p. 402.

there were seventeen creameries and cheese factories in the State in 1869, forty-nine in 1879 and fifty-nine in 1889. Commencing about the year 1890 a sudden fever to establish creameries seemed to prevade a large portion of Indiana. Most unfortunately for our dairy interests, one or two creamery supply establishments did all they could to increase the desire for such outfits. They sent smooth tongued agents all over the State who persuaded farmers to coöperate and buy outfits of their houses at prices far beyond all reason or justice. Expensive creameries were erected and equipped in localities entirely unprepared for their economic use and where no considerable amount of milk was available for use. As a natural result, it was not long before insolvent creameries began to dot the Indiana landscape in every direction. Hundreds of farmers who were stockholders of the collapsed concerns cursed the supply houses and declared the dairy business a snare and a delusion. They seemed to forget that they had gone into this thing in most instances with a degree of ignorance of the business that was wholly inexcusable. They had simply been dupes in a sort of confidence game. They knew nothing of the economical erection and equipment of a factory; they knew nothing of the cost of maintaining a plant; they knew nothing of modern dairy methods, and they guaranteed nothing substantial in support of their dairy banks. And so the creameries failed right and left, and we are told to-day that some two hundred dead or alive factories are to be found within our geographical limits. As a result of this condition, the dairy business in Indiana has received a serious set back. Dairy cattle and butter and cheese making are looked upon with scant favor in many localities where favorable dairy conditions would otherwise exist, all of which is due to an unfortunate condition, for which true dairying is in no manner responsible. It will take some time to counteract the effect of this misfortune, but time, which heals all things, will eventually enable the dairy wound of Indiana to heal.

At this point it is appropriate to refer to the advantage of Indiana as a State adapted to the production of milk, butter and cheese. Select what State you may, you will find in it many people who, in their enthusiasm, will assert that their State has unsurpassed advantages for dairying. This is true North, South, East and West. The pure water, sweet grass, etc., are always cited as a proof of this assertion. Yet there are certain conditions which exist in some States which offer inducements far superior to those of other regions. While fine butter may be, and is, made in the South, for the great mass of the people the long hot seasons offer serious arguments against much commercial butter-making unless ice is convenient and cheap. In the far West or Southwest the matter of market or climate may be a great obstacle to economical production on an extensive scale.

So far as Indiana is concerned, there are a few arguments in favor of the dairy industry to which I wish to briefly call your attention—arguments which can not be produced, I believe, to so great an extent by half a dozen other States in the Union. We are located almost in the center of population in the United States, with a network of railroads completely covering our State, ninety of the ninety-two counties being penetrated by them. Within a radius of comparatively few

miles, with Indianapolis as a center, are located some of the largest, most prominent cities of America. Chicago, bordering the line, has over 1,000,000 population; St. Louis, with 500,000, is 265 miles to the west; Cincinnati, with 300,000 or more, is 110 miles to the southeast; Cleveland, with nearly 300,000, is 283 miles to the northeast; Pittsburgh, with 250,000, is 381 miles to the northeast; Louisville, with 170,000, is only 110 miles to the south; Detroit, with over 200,000, is 250 miles to the northeast; while Indianapolis as a center has over 150,000 population. Here we have over two and three-quarter million inhabitants in large cities, offering unsurpassed markets for our produce, to say nothing of numerous other large cities in our own State and Ohio, Illinois, Kentucky, Michigan and Missouri. And so it can be said with truth that Indiana offers market facilities of the very highest order—a most important factor for the producer to consider.

Another important factor in the economical production of dairy goods lies in the cost of food and labor in this State. The staple cattle foods and labor are materially cheaper than they are with our Eastern or far Western neighbors. Although the price of butter has been very low during the past two or three years, so also has been that of cattle foods. Under ordinary conditions now existing the dairy farmer will make more money than the grain-grower who depends on the sale of grain for his income, and he will at the same time maintain the fertility of his farm, where the grain-grower will reduce it in a marked manner. As the fertility of the farm becomes reduced, in just so great a measure will the cost of production be increased. One of the strongest arguments in favor of the dairy industry in the older settled States lies in the fact that this business restores farm fertility instead of reduces it. One ton of butter sent off from the farm takes away practically no fertility, while a ton of wheat removes about \$8.50 worth of plant food, and a ton of corn about \$5 worth. Such figures speak for themselves.

Corn and oats are staple dairy cattle foods, grown with us at a very low cost, and bran may be purchased at our mills at a far lower price than anywhere east of us. Should we desire to purchase the by-products of the manufactures, we have in Indiana linseed oil, hominy and cerealine mills, and near by in Illinois glucose mills, the by-products from each of which furnish valuable supplementary foods for dairy cattle. When we consider the forage plants, no where can corn or clover be produced with greater success or economy than in this State, while our fields of blue grass are unsurpassed in the world, not excluding the famous ones of Kentucky. Indiana is a natural blue grass region.

The low cost of living in this State, in many localities, enables employers to secure help at prices much below that paid elsewhere. Of course this is not for skilled labor, but for persons competent to perform many of the duties of a dairy farm. In the southern part of the State labor may be secured at prices materially less than that paid in the northern part.

The Indiana climate is no better nor worse than that of many of her neighbors, and in it we find no arguments more favorable for the industry here than may be granted to a score of other States. Neither is our water superior to that of our neighbors. Still there is enough of respectability to both our climate and wa-

ter to enable us to make butter and cheese of the highest quality, if a sufficient amount of brains is used in the operation.

The most common argument against dairying which comes to my ears is that it is an exacting occupation, which requires the attention of the owner of the cow seven days in the week for 365 days in the year.

There are some people in this world, in fact a good many, who on general principles object to any occupation which requires continuous attention to business. There are others who are willing to work, yet to whom the dairy business is distasteful. It is perfectly proper that the people in either of these classes should look to some other line of work for their support. It is, however, true that dairying is no more exacting to those engaged in it than are most other kinds of business. The energetic business or professional man in town usually has his work on his mind to an extent unsurpassed by any one else. The doctor or lawyer who is successful is not given to passing much time in indolence. Complete success in this world is always measured by persistent, unceasing, honest industry. There is no exception to the rule.

It will not be inappropriate at this place to give an expression upon the matter of recreation for the dairyman. While there are exceptions to all rules, the average dairyman, if he will, can so arrange his affairs as to secure an annual vacation. It does not indicate the best business management for one to say that he can not get away from his work. Either he lacks responsible, competent help, or else is undertaking more than his own strength will justify. He certainly should be able to command some free time that will enable him to attend dairy conventions, to visit dairy farms for new ideas, and to generally tone up his physical and mental system through the occasional rest which is essential to the well being of every man. If there are those who will say that the dairyman has to work too hard, I will point to the fact that, where he applies his energies with intelligence, he is one of the most prosperous persons in the farming community. Dairy districts usually show a prosperity of a pronounced type. During these hard times every business man and farmer has suffered financially, but I have heard much less complaint from among those engaged in dairying than from the general farmer and stockman. An observing friend of mine who is deeply engaged in agricultural work, made a visit of inspection to the Elgin dairy district. He was much impressed with the evident prosperity of the people, and while some of them complained of the work involved, they admitted that they made money in the business.

In conclusion I wish to say that there is work ahead for this Association to do, that will have a great influence upon the prosperity of the dairy interests of the State. We have become a well-established State Association, and have never been in better condition to demonstrate our usefulness. Let every member take an earnest and active part in promoting the best interests of this Association and the work in the State. Let us urge and fight for the establishment on our statute books of satisfactory laws for the protection of our dairy interests. The coming session of the Legislature should pass a pure food law which will include dairy products, and also pass a law to regulate the manufacture and sale of artificial

dairy products in Indiana. I believe that it will be well for a strong committee to be appointed at this meeting for the purpose of promoting legislative action in our behalf.

We need to strengthen our Association in membership. If each one of us can secure one new member this year, we will become doubly strong numerically, and I hope morally. Let us go out among our friends and warmly urge them to join our Association. Let us secure at least one hundred new members this year.

A movement has been instituted in Wisconsin to urge upon Congress the passage of a law establishing dairy trademarks, and making it a misdemeanor to counterfeit them. This means that the private mark stamped on butter and cheese shall be controlled by the person taking out the first right to use the same. Such a law would be a benefit to both producer and consumer, and its passage by Congress would receive our emphatic support in every way possible.

It is customary for dairy associations of the dignity of this one to receive aid from the State treasury. Our State Horticultural Society receives an annual appropriation of \$1,000 from the State. We should use every effort to secure an appropriation from the coming session, that we may have a fund of money suitable to employ speakers from abroad for our meetings and to assist us in paying our current expenses. Such money could be profitably appropriated by the State.

In another direction, we as members of this body can do a good work. It is that of urging our people to educate themselves, and being up-to-date dairymen. Too many dairy papers and books are not likely to be read. Every man, a specialist in this field, should take a good dairy paper, and, knowing what is going on in the dairy world, he would find it a profitable investment. And, I can not lay too much stress on the necessity for the education of our young men and women in the dairy schools of the land, where correct principles and the best practices are taught. While the dairy instructions at Purdue University is modest in character, a good chance for dairy training is offered the young men and women of the State who wish to avail themselves of its advantages.

It has been my great pleasure to attend each of the sessions of this Association since its organization and to take an active part in the work during the past six years, and as President to-day, I take the liberty to thank the numerous members who, on so many occasions, have cheerfully and willingly given their time and services in the work of building up the State Dairy Association and the dairy interests of Indiana. We have ever been an harmonious united body in the past, and I trust we shall always be so in the future. And inasmuch as we have a great work ahead, let us all wish the Indiana State Dairy Association a long and prosperous career.

President Plumb. We will now be favored with some more music, after which Dr. Burrage will deliver an address on

MILK AS A BREEDER AND CARRIER OF DISEASE.

BY SEVERANCE BURRAGE.

Mr. President, Members of the Association, Ladies and Gentlemen:

My subject to-night is "Milk as a Breeder and Carrier of Disease." Milk has been known for several years to be the means of carrying various infectious diseases and spreading them in epidemic form. I refer now particularly to such diseases as typhoid fever, scarlet fever, diphtheria, cholera, and so on. These are all infectious and some of them contagious, and from what is known of them to-day, that they are caused by minute, living germs, they can all be regarded as *preventable*. In short, knowing the cause, we are in a better position to prevent them. But just what do we mean when we say that a person has got typhoid fever? Simply this, that this person has in some way taken into his alimentary canal, through the mouth, some infected or germ-bearing material, that has come from some other person affected at some previous time by the same disease. As we understand it to-day, that is the only way that a case of typhoid fever can arise. The germ growing within the body produces its poisons, which cause the various symptoms that the doctors call typhoid fever.

Probably you all know, in a general way, what these germs or bacteria are. They belong to the lowest order of plants and are extremely small. Some are shaped like tiny sausages, some like tiny spheres, and some spirals. They are so small that it would be hard to give you a definite idea as to their size. It is not at all uncommon to find them one twenty-thousandth of an inch long. And these bacteria or "microbes," although they occur everywhere, in the air, soil, water and foods, are not all dangerous, fortunately for us. Just as we have in our fields and forests hundreds of beautiful trees, shrubs and plants, among which there are, perhaps, fifteen that are poisonous when touched or eaten; just so we have in this microscopic bacterial world, hundreds of harmless and even useful forms, but at the same time a comparatively small number of disease producing ones.

If we examine a drop of milk as it is put on the table ordinarily, we find a large number of these bacteria, most, if not all of which are perfectly harmless. But it must be borne in mind that wherever these harmless forms occur, it is possible for the disease germs to be found as well. Milk taken directly from the udder of a healthy cow is perfectly sterile, that is perfectly free from these bacteria, but if we examine the milk a few moments after it has been in the bucket we find a large number of organisms present. Where have they come from? How have they gained access to the milk? As a matter of fact the sources of bacteria in milk are many, and it will be instructive to look at this every-day process of milking with the idea of microbes in mind and see what excellent chances they have for getting into the milk.

The man who is to do the milking gets up in the early morning and goes out to the stable, oftentimes without washing himself. He takes the bucket, which

may or may not be absolutely clean, seats himself on the stool beside the cow, and during the more or less vigorous shaking of the udder, the rubbing and scraping of the sides of the cow by the shoulder and hat of the milker, much very objectionable material may and must reach the milk. The sides, tail, legs and udder are matted with manure and dirt, and this filth is known to contain myriads of these tiny germs, which must be brushed with the dirt from the cow directly into the milk bucket. This bucket, made with its flaring shape, is particularly well adapted to catch any dust and dirt that comes its way. Here we can see one of the principal sources of the bacteria that we discover in milk soon after it leaves the udder. Milk is a most favorable medium for the bacteria to fall into, looking at it from this standpoint. It is an excellent food material, and being of a warm temperature these tiny plants multiply most rapidly in it. According to good authority (*1) one individual bacterial cell can under favorable conditions give rise in twenty-four hours to sixteen and a half millions of progeny. Allowing, then, that in the ordinary process of milking many bacteria reach the milk, it is not difficult to account for the large numbers that are found by bacteriologists in various samples. In a study of the milk supply of the city of Boston (*2) an average of fifty-seven samples showed 2,355,500 bacteria per cubic centimeter, and out of fifteen samples taken from the tables of well-to-do families in the vicinity of Boston an average of about 69,000 bacteria per cubic centimeter was obtained.

I have made several analyses of milk from various sources in Indiana, and found the numbers of bacteria per cubic centimeter ranging from 500,000 to 1,500,000. If the analysis is made of a sample taken directly after milking, the numbers of bacteria are much smaller, but at the same time greater than we would expect. From these figures we can easily see that the average city milk is not *normal* milk. In order to keep the milk as near the normal as possible, we must remove all conditions which harbor dirt and dust about the barn; the cows must be kept clean, the pails and buckets carefully washed and the milkman, or whoever does the milking, must be cleanly in his or her habits. All these factors are important in the attempt to give good milk to the customers. Some men in their attempts to clean the barn are so zealous that they sweep up the floors just before milking, thereby raising the dust at just the most favorable time for it to fall into the bucket and on the milker's clothes. But very few will allow their enthusiasm for cleanliness to carry them into this error.

A microscopical examination of some unstrained milk as described by Grotenfelt (*3) gives results which are startling to those who do not know already the filthy character of milk. Among the foreign substances noticed in this examination were manure particles, fodder particles (which have not passed through the alimentary canals of the animals), moulds and other fungi, cow hairs, particles of skin, human hair, parts of insects, down from birds, woolen threads, linen threads, soil particles, pieces of moss and fine threads, possibly cobwebs. The nature of

(*1) Prudden—The Story of the Bacteria.

(*2) Sedgwick & Batcheller, 1890.

(*3) Principles of Modern Dairy Practice.—Grotenfelt. Tr. Woll.

much of this foreign material is such that we know many bacteria are contained in it, or clinging to it; and while the majority of all such bacteria are perfectly harmless, yet we must bear in mind that conditions which favor the growth and spread of these, also favor the pathogenic or disease-producing forms. These facts would all seem to indicate that the barn was the principal source of the bacteria in milk as we ordinarily find it on our tables. While this is true, there are many chances for infection after the milk leaves the farm. Before the milk reaches the consumer, it usually passes through the hands of one or two milk dealers. This is particularly so in the case of city milk; and it does sometimes happen that during this handling, some water gets into the cans, perhaps accidentally. This may not do any harm as regards the health of the consumers if the water is pure; but the trouble is that a very large number of the country surface wells are contaminated with drainage from the barns or out houses, and in such cases typhoid fever might easily be spread in epidemic form, if such dangerous water be added to the milk.

All of these facts have been given with the understanding that the cows, milkers, and all milk men who handled the milk were perfectly healthy. But it has been shown a great many times that milk from diseased cattle is unhealthy. On a large milk farm, or on a small one, as far as the theory goes, no sickly person should ever be allowed in the stable where the cattle are kept, because there is the chance that the germs of disease may be spread to the customers through the milk.

It is very important indeed that young children should have pure milk for their food. They are absolutely dependent upon it for the first few years of their lives. It is about all they have; therefore if this milk, their principal food, is not good, they are going to suffer. The number of deaths among children under five years of age is appalling. While there are several factors that contribute to this high death rate, bad milk, as milk is the principal food, must have its casual relation to it. Children are naturally more subject to various diseases than adults. Diphtheria is a child's disease, that is, it occurs in the majority of cases in children. In several instances diphtheria epidemics have been traced to the milk supply as their source. In England certain cases of diphtheria have been supposed to arise from drinking milk from cows having a diseased condition of the udder.

Scarlet fever also has been spread through infected milk and traced back to diseased cows. But typhoid fever is the best to illustrate epidemics spread by milk. A number of milk typhoid epidemics have been carefully studied, and while in no case was the disease supposed to arise from unhealthy cattle, in almost every instance, some direct means was found by which filth, including human excreta, had gained access to the milk. An epidemic of this kind in which I was personally much interested, occurred in Springfield, Mass., (*1) in August, 1892. There were one hundred and fifty cases, out of which one hundred and one took milk from the same milk man, and one hundred and thirty-five had access to it. It was found, after a most difficult search, that some of the milk was cooled by the cans being lowered into a polluted well. Some of this filthy water leaked into the cans. Upon further investigation it was found there had been a case of typhoid on that farm a short time before. And while the actual method of polluting the well was not

(*1) Mass. State Board of Health, Annual Report, 1892.

discovered, the circumstances were such that there was no doubt as to the source of contamination.

The question of consumption and its relations to milk from tuberculous cows is an important one. It has been found, as you all know, that a much larger proportion of our cattle are afflicted with the disease than was thought possible. Now I am looking at this question from the standpoint of the public health. One person in every seven of us, according to reliable statistics, are to die of consumption, or tuberculosis in some one of its forms. It is impossible to say how many cases arise from drinking the milk of tuberculous cows. We do know that the germs of the disease are found in milk from affected cows, particularly if the tubercles are in the udder. The insidious, slow-working nature of the disease makes it very difficult to trace directly to any one source, as the channels of infection are so numerous. But as milk and meat are such widespread and important foods, and as the disease is so generally distributed among cattle, it is not unreasonable to conclude that many cases in the human family arise directly from infected cattle. Everything possible should be done to get rid of tuberculous cows. It can not be estimated how much trouble has come from mixing the milk from diseased animals with that from healthy ones and spreading the disease in that way. From the public health standpoint, this is a very serious matter. It is not my purpose to discuss here the advisability of a general application of the tuberculin test. I must say that it has proved very efficient in detecting the presence of the disease when all other methods of diagnosis have failed. This being true I shall leave it to you to judge for yourselves whether from my standpoint again, you would have the test applied to your own herds, thus separating the diseased from the healthy animals, and thereby not subjecting your own family, or the families of your customers to infection.

Other diseases have been spread in epidemic form through the agency of milk. Epidemics of scarlet fever and diarrhoea, especially among young children, have been frequently traced back to the milk supply. Dr. Beach, of Ohio, believes (*1) that 25 per cent. of western pioneers and their families died of a severe gastrointestinal disorder brought on by using milk from cows suffering from the "tumbles."

In some ways this talk undoubtedly seems a great deal like a sermon to many of you. But I don't wish that to detract at all from the facts which I have stated, and which I believe to be very important. A man who has a clean stable, clean and healthy cows, and careful helpers is going to fare much better in the long run than the man who has the reverse conditions. People are gradually realizing the importance of being careful about the healthy condition of their houses and barns, and also about their various food materials. And, as we have seen, milk is a very important food material, and the people at large are beginning to demand a better and purer quality of it. And to you, as owners of dairies, I desire to emphasize the necessity of each one of you doing his share in reforming many of the conditions as they now exist. While many of you may think your stables and surroundings are all right, would you be willing for me to come and examine the conditions with microscopic eyes?

(*1) Text Book of Hygiene.—George H. Rohe, M. D.

I thank you very much for your attention to-night, and only hope that some of these facts have been firmly impressed in your minds. There is one thing I forgot to state. Much is being said about sterilized and pasteurized milk, but I think you will find that babies will flourish best on normal healthy cow's milk. In the various heating processes mentioned, the milk is slightly changed, so that it is not quite as digestible. Therefore, unless there is much from diseased cattle in the herd, I do not believe that it is advisable to sterilize or pasteurize the milk. I thank you.

President Plumb. There being no discussion on this paper we will now be favored by a selection of music, followed by a paper on "City Dairying," by Mr. Billingsley, of Indianapolis.

CITY DAIRYING.

BY J. J. W. BILLINGSLEY.

In the selection of cows for city dairying such animals should be selected so as to produce milk having a good body.

Many customers will pour the cream from the top of the bottle and use the remainder for a drink.

If the milk has a heavy per cent. of butter fat, which rises to the top, leaving very poor skim-milk, the trade will not be satisfied with it.

While it is desirable to show a deep cream line on the bottle, it should also leave the milk below with a body good enough to make it palatable to drink.

Our herd has been selected to meet this want of the trade. We have Jerseys, Holsteins, Grade Jerseys and a few of other breeds.

A dairy herd should be composed of strong, vigorous animals without a single exception. The city dairyman should in no case deliver milk to his trade that he would not willingly use in his own family.

He should keep in mind the fact that the health and possibly the lives of his customers are dependent upon this important food production. Many babes will depend exclusively upon his milk supply for their daily food.

FEEDING THE COWS.

We feed only sweet food—corn and cob meal crushed fine, oats, bran, oil meal, corn fodder cut to one-half inch, millet and clover hay in the fall and in early winter; later we feed silage, together with corn and cob meal, bran, oil meal, oats and clover hay, with an hour's grazing occasionally upon a rye field when the ground is in right condition.

We graze in summer and feed soiling crops; first green clover, with silage, oats and peas, green corn and sorghum.

We change the ration from time to time to increase the consumption of food.

We aim to feed each animal as much as it will eat with a relish and digest well, and avoid as much as possible too much dry food.

Cut corn fodder should be wet down in a mixing box after cutting long enough to soften the woody fibre, then mix with bran, making a chop. By this method the milk flow can be kept up, and the food will all be consumed except bits from the longest stalks.

The milk flow should be kept up to the full standard, so as to meet the wants of the trade and insure the largest milk production.

The food should be given regularly at the same time of day or evening; also, the watering should be equally regular and as often as they wish to drink.

If a good watering tank is conveniently near, the wants of the herd can soon be learned by a little observation.

They should have pure, fresh, deep well or spring water—water absolutely pure.

Milk is 87 per cent. water, sometimes more, hence the need of looking carefully to this point. Don't give them ice water in the winter. If you do you will pay for it in less quantity of milk produced.

Tepid water is best in winter, but fresh water from a deep well will do.

We know that cows will drink from dirty ponds and mudholes, and seem eager to do so, but it is not best for them.

Some men will drink whisky and lager beer and smack their lips and seem eager to drink, but it is not best for them.

The best and healthiest drink for man and beast is pure water.

We have never fed starch feed; the smell of it is enough, let alone making an animal eat it.

Neither have we fed brewers' grain. We entertain the opinion that with either food or both the milk is not so good.

It is said by those who feed these foods (and many dairymen do feed them) that cows give larger quantities of milk.

One dairyman remarked in our presence that starch feed and brewers' grain fed to cows would increase the milk flow until it was very much like pumping it out of a well.

It is barely possible that we are somewhat prejudiced against these foods.

In order to secure the production of good, healthy milk, such as we like to drink, we prefer to feed only sweet food.

THE DAIRY BARN.

A dairy herd should have warm, well ventilated quarters, kept as clean as the conditions will allow, summer and winter.

During the summer we use slaked lime to coat the gutters and sift over the floor, and white-wash the inside of the stables at least once each month.

Lime is sifted over the floors and gutters as soon as the cows leave the stable. In so doing we get rid, in a large measure, of the fly nuisance, and prevent impure odors likely to be absorbed by the milk.

The use of lime no doubt serves to liberate the ammonia in the droppings and urine; but be it so, we prefer to suffer the loss if we can prevent the reproduction of flies and have snow-white floors and walls and a pure atmosphere.

In winter keep dry bedding for the cows to lie down comfortably upon, and prevent the accumulation of filth upon the udders.

Curry the cows occasionally; they will enjoy it, and will look and do better.

During the winter weather, when there are warm sunshiny days, let the cows out to take a sun bath and a little exercise, but keep them in warm quarters when there are chilly winds.

HANDLE KINDLY.

At all times handle kindly; never speak harshly to them; keep all clubs, whips or stones out of reach.

We say to the men who milk, always speak to your cows as kindly as you would to your "best girl." If you do the cows will do better, milk better and give more and, we think, better milk.

We feed, then milk. Those who milk are required to milk the same cows regularly. The cows get used to them and are less nervous.

Occasionally it may be necessary to change a cow from one milker to another, for the reason that they are less nervous for one milker than for another.

Milkers are required to brush off the udders before commencing to milk to get rid of fine particles of the bedding likely to adhere, and also the scales from the skin.

If the udder is foul, they are required to wash it and dry it with a cloth before the milk is drawn.

Milk quickly, with a full hand, and remove the milk to the cooling rooms, where it is passed through a double strainer before pouring into the aerator. The milk of several cows is strained into a large can so as to make a good average milk; then it is passed through another double strainer into the aerator, where it is cooled down until it is pleasant to drink.

By aerating we reduce the temperature to about 55 degrees and get rid of the animal odor.

The milk is then taken to the bottling room, and bottled in pint and quart bottles and set in a cooling box, in ice water in extreme warm weather and in deep well water at other times. In a short time the cream line will show on the bottles.

The milk set to cool the evening before will show a heavy cream and is boxed first to be set in the dairy wagon. The boxes hold three gallons of milk in quart bottles, and two and one-half gallons in pint bottles.

The bottles containing the morning milk are set in boxes and covered with ice in warm weather, to further cool the milk in transit to the city and aid in raising the cream.

The dairy wagon when loaded in summer is usually started at five o'clock in the morning for the city; in the winter at six o'clock.

We make but one delivery during the day. The milk is delivered to customers by setting a full bottle, or two or more if the customer use so much, in place of empty bottles set in some designated place, the required number of tickets being put into the empty bottles, the ticket or tickets indicating how much milk is wanted for the day.

Many of the customers are not seen by the milkmen from week's end to week's end, except when they want a fresh supply of tickets, and the hired girl usually attends to that.

The delivery of the milk will require from four to five hours' rapid work. Milk routes in the city are much like the practice of some physicians—very much scattered, requiring much travel.

THE BOTTLE SYSTEM.

The change from the can to the bottle system of supplying milk to the retail trade in towns and cities has gone on slowly but surely.

The can system is objectionable for the following reasons:

It is not possible to supply each customer with an average milk—cream and body milk. The cream being lighter is all the while raising to the top, and the agitation of the milk to equalize it is objectionable, exposing the milk to the air and the dust and germs ever present in the atmosphere, seriously affecting its keeping quality.

Besides, every milkman will experience more or less dissatisfaction in the trade, and being on the alert to hold his trade, and pacify those complaining, he will fill their measure often from the top of the milk, giving more than the right proportion of cream. If the milk is drawn through suncets at the bottom of the can, the first deliveries will be poor milk and the last cream.

To avoid this inequality, some milkmen have long handled dippers so as to dip to the bottom of the can each time in filling the measures, which is better. But even this method with the utmost care will not fully equalize the milk delivery or protect from exposure.

Another objection which may be urged against the can system is, that customers will furnish wide mouthed vessels to receive the milk and afterwards set them in chests, coolers or in places exposed to the decay of vegetable matter or unpleasant odors. The milk readily absorbs the odors and the milkman is charged with furnishing impure milk. This feature at times is very annoying.

The bottle system faithfully observed at the dairy rooms will enable the milkmen to deliver to each customer the average of cream and body milk, without exposure to the air or undue agitation, and after it is received it is less exposed to unwholesome odors, on account of the less exposure of surface.

THE CARE OF MILK VESSELS.

Much depends upon the washing and steaming of cans, bottles and other vessels used in handling the milk.

No pains should be spared in keeping milk vessels absolutely clean, pure and free from the lodgment of any germs likely to affect the milk.

USE OF PRESERVATIVES.

A few dairymen use preservatives, soda, borax and other chemicals.

These substances are not poisonous, but they are considered to be injurious to the health when taken regularly even in small quantities. The use of such preservatives should be prohibited by law. The danger from their use would be less if they were handled by persons who knew their probable effect upon the digestive organs.

Milk which does not sour soon after being exposed to the open air and a warm temperature, is subject to suspicion, that some preservative has been used to prevent a natural result. We have never used a preservative of any kind.

CARE OF MILK BY CONSUMERS.

Milk when received should be placed in clean vessels and securely covered, in a cool place free from odors. If received in bottles and kept sealed it will be sufficient to keep it cool.

Milk kept cool and covered should keep from twenty-four to thirty-six hours without souring.

If the milk is allowed to stand in the sun or otherwise be exposed, the time that it will keep sweet will be correspondingly lessened.

A REPUTATION.

A point well gained in selling milk in a town or city is a reputation for furnishing good milk.

Such a reputation will draw trade from unexpected sources and the milkman can realize better prices, and secure a better class of customers.

If a milkman is known to furnish an extra quality of pure milk he will be recommended by his trade to the patronage of others.

Physicians will advise those of their patients who are in need of pure milk to get their supply of the dairy having a reputation of supplying their trade with healthy milk.

Honest, faithful effort in the milk business, as in everything else, will pay best.

SOME OF THE PERPLEXITIES OF THE BUSINESS.

The business of city dairying figures up very nicely to the uninitiated, about as follows:

Milk selling at 25 cents per gallon,—a cow giving three gallons per day for three hundred days in the year, makes a total receipt of \$225.00 per cow; cost of keep at \$35.00, leaves a balance of \$190.00; or putting the average product per day at two gallons or six hundred gallons per year—deducting \$35.00 for keep, gives a balance of \$115.00 per annum.

This is all very nice on the credit side of the ledger and it would be very satisfactory if it worked out as indicated, but the expense side of the account very sharply cuts these figures down.

Hired help, repairs, broken and lost bottles, keep of team, bad accounts—yes, bad accounts. Some one says, I would sell for cash. Well, yes, you would, perhaps, if others did. Some customers do pay in advance, others do not. The milkman has to meet the sharp competition of others, who probably sell cheaper milk on time, and he must take the risk to hold his trade. Occasionally some one will "fold their tent" and go hence. We have had but little loss from such removals, but it is one of the items to be considered in profit and loss.

Another unpleasant feature of the business is the frequent changes necessary to be made in the herd. A cow may develop some imperfection, making it necessary to supply her place with another. She is sold in the market for whatever she will bring, probably at a loss of \$10, \$15 or \$20 on the first cost. Another is purchased, and with the best judgment she may not meet expectations. Cow owners are not always truthful; some hidden fault may necessitate another change, and so on. In no other business is there a more constant demand for an all-seeing eye or more mature judgment and persistent effort. Another unpleasant feature is the loss and breakage of bottles. Customers are not always punctual in setting out the empty bottles. The milkman comes, finds no bottles, but he knows the amount of milk which they usually require; the customer is in bed probably, and would certainly be offended to be rung up at unreasonable hours, even at 8 o'clock A. M. The best he can do is to set out the milk and go on. This may occur two or three times in succession. Besides, bottles are so convenient to take to the grocery for vinegar or molasses, or even coal oil, that the temptation to hold them back for private use is so pressing that it is a source of annoyance and loss to the dairyman.

It is well for those receiving milk in bottles to wash them when they are empty, but they are frequently broken by pouring boiling water into them. It would not do to demand pay for them—they would be offended and thereafter get their milk supply from some other milkman.

It is annoying to pass the residence of some patron at 9 o'clock in the day and see the bottles of milk delivered at 7 o'clock A. M. standing in the sunshine, especially if they have been in the habit of complaining that the milk does not keep sweet. Again, if the complaint comes to you that the milk does not keep well, you find that the bottles have stood open in a room heated to 70 degrees with gas fires. Of course, one will feel somewhat annoyed at the want of a little common sense along this line.

There will always be some people who can not be pleased, do what you will, with every possible effort to perfect the milk product—even to a turkish bath between milkings, they will complain and want cheaper milk.

Again it is annoying to have to compete for the trade against those who do not furnish clean or good milk, who depend upon the cheaper article to get a trade, who have no scruples in selling the milk from diseased cows. It is annoying to have them follow behind at a distance and set out samples, offering lower rates, even four cents a quart, to steal your trade. While you may not lose a customer, you do feel a good deal like using a club.

Last, though not least, is the slavery of the business. Three hundred and sixty-five days in the year are required to conduct the business. No Sunday, no holiday, no rest! From 3:30 A. M. to 7:30 P. M., sixteen hours a day are required

to keep everything in order. With all, there are some compensating features. The daily cash receipts, the hearty commendations of many customers, the many things learned almost daily in the management of the business—the study of animal life, and its adaptation to our wants, when we keep in harmonizing touch with it—all go to enlarge the breadth of our knowledge, so we go on, hoping for a better success.

President Plumb. The meeting will now stand adjourned until 9:30 to-morrow morning.

SECOND DAY'S PROCEEDINGS.

DECEMBER 30, 1896.

The meeting was called to order Wednesday morning at 9:30 o'clock, and the exercises were begun with a song by Mrs. B. F. McKey, entitled 'I Can Not Sing the Old Song.' The house rang with cheers, and she then sang another, entitled "Jerusalem."

President Plumb. The first thing this morning will be the bringing up of miscellaneous business. We are now ready for nominations of committees of invitation to hold the annual meeting of the association in their places, and also the election of officers.

Mr. Woods. I move that a committee on nominations be appointed.

Secretary Beckman. It is moved that a committee on nominations be appointed. How many shall compose that committee?

President Plumb. Five.

Secretary Beckman. It is moved that a committee of five on nominations be appointed; will some one second that motion?

Motion is carried.

President Plumb. I will appoint that committee a little later. I want, before you go on, to suggest to you whether or not it will be advisable for us to transact the balance of the business this morning, for this reason: Messrs. Furness, Klausmeier and Harris have not been with us yet, and I don't say that they will come, but they have promised to be here to-day. Mr. Klausmeier wrote me that three members of his family are sick and that he could not be here. I have heard nothing from the other two. There are two on the morning session that will not be here. We have three persons left—Messrs. Billingley, Benjamin and Hoadley—so it seems to me that we will not be able to have a program this evening.

Mr. Isenhour. Mr. Furness told me last Thursday that he could not be here at all. I requested him, if he could not be here, to send his paper so it could be read.

Mr. Benjamin. If Mr. Riley is here, how about having him discuss that question that we didn't have time for yesterday?

President Plumb. He will not be here.

Mr. Benjamin. I would like to hear that question discussed. Mr. Husselman is here, and I presume there are others that can help.

President Plumb. I think we can get others.

Mr. Roberts. There are so many questions and so many that have had more experience than I that I think we might have some discussion.

Mr. Woods. I prefer that a number of the afternoon workers be put on this forenoon. I think the talk on one of the papers yesterday was cut very short.

Mr. Johnson. Discussions generally bring out the new members. I suggest that we hold an afternoon session and divide the program.

Mr. Husselman. Let me suggest that we have one hour for a "quiz" meeting—ask questions and answer them. I have attended several meetings of this kind, but not exactly dairymen. Those who come to these meetings ought to take a part or be barred out. At a good many of these meetings, where persons fail to appear on the program, they would have a half hour for a "quiz" meeting. I want to suggest that.

President Plumb. We will decide to hold an afternoon session to enjoy ourselves. I want to announce the committee on resolutions at this time, and state that if any parties here wish any particular clause put into the resolutions they will please hand it to the chairman of that committee, Mr. Johnson. If you will note it on a piece of paper and hand it to the committee at noon it will be received and given the proper attention. There is a matter which I referred to in my address last night that should properly come before you now, and I will call your attention to it. I received a circular letter from Mr. George W. Burchard, President of the Wisconsin Dairymen's Association. It is not very long, and I will read it to you:

DEAR SIR—The Dairymen's Association of Wisconsin has agitated for some years the question of securing, under national laws, a distinctive trade-mark for each State for use upon that State's products, under such supervision and limitations as such State may see fit to prescribe. Of course, the special interest of our Association was the protection of the reputation of our State dairy products from unscrupulous makers and dealers, whether resident within or without our borders, but there seems to be no good reason for limiting the scope of such a measure (if it has any merit whatever) to dairy products alone.

The U. S. Supreme Court having decided the general trade-mark law unconstitutional because it assumed to place trade-marks in the same class with copyrights and patents, and in that decision intimated that legislation treating them as adjuncts of foreign and interstate commerce would be sustained, I ventured to make a draft of a bill for that purpose, which, with accompanying remarks, was published in "Hoard's Dairyman," and, having been approved by Prof. Henry and others, was forwarded to the member of Congress from this district, Mr. Sauerhering, and by him introduced at the last session of that body. This bill is No. 4349 H. R., and may be referred to by that number and the name of the member introducing it.

A BILL

To Protect and Promote Foreign and Interstate Commerce.

Be it enacted by the Senate and the House of Representatives of the United States of America, in Congress assembled:

SECTION 1. That in order to prevent the false branding or other marking of goods, wares or merchandise, the product of any State or Territory of the United States or of the District of Columbia, which are, or are intended to become, articles

of foreign or interstate commerce, the Governor of any such State or Territory and the Commissioners of the District of Columbia are hereby authorized and empowered to adopt a public trade-mark, each for his or their respective State, Territory or the District aforesaid, and file a description and illustration of the same in the Treasury Department of the United States

SEC. 2. That upon the receipt of any description and illustration of a trade-mark, as provided in the preceding section, and upon the payment of a fee of twenty-five dollars, the Secretary of the Treasury shall register the same, and a certificate of such registration fully describing such trade-mark shall be issued in the name of the United States of America, under the seal of the Treasury Department, and signed by the Secretary of the Treasury, and a full record thereof be made and kept in books for that purpose. Copies of any such trade-mark and of the descriptions accompanying the same and of the certificate of registry, when duly authenticated by the Secretary or any Assistant Secretary of the Treasury, shall be received in evidence in all courts and by all officers of the United States, and shall be conclusive proof of the adoption and registration of such trade-mark.

SEC. 3. That every such trade-mark shall be used only under and in accordance with such rules, regulations and restrictions as may be provided by or according to the laws of the State, Territory or District adopting and filing the same, and upon goods, wares and merchandise produced, grown or manufactured therein and upon packages and wrappers containing the same.

SEC. 4. That every person who, contrary to the provisions of this act or to the laws, rules, regulations and restrictions of any State or Territory or of the District aforesaid, affixes the registered trade-mark of such State, Territory or District, or causes or procures the same to be affixed, or any colorable imitation thereof calculated to deceive the public, to any goods, wares or merchandise, which are, or are intended for sale, shipment, consumption or use without and beyond the boundaries of such State, Territory or District, or to any package or wrapper containing the same, shall be deemed guilty of a misdemeanor, and on conviction thereof be punished by a fine not exceeding one thousand dollars or imprisonment for not more than two years, or by both such fine and imprisonment in the discretion of the Court.

SEC. 5. That every person who shall knowingly deal in, or sell or keep or offer for sale, or cause or procure the sale of any goods, wares or merchandise, in order that the same may become, or after they have become, subjects of foreign or interstate commerce, to which, or to the package or wrapper containing the same, there is fraudulently affixed any public trade-mark as provided in this act, or any colorable imitation thereof calculated to deceive the public, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished as provided in section four (4) of this act.

SEC. 6. That any person who fraudulently fills, or causes or procures to be fraudulently filled, any package, or fraudulently uses or causes or procures to be used, any wrapper, to which is affixed any public trade-mark registered pursuant to the provisions of this act, or any colorable imitation thereof calculated to deceive the public, with any goods, wares or merchandise, with intent to deceive or mislead any purchaser or user of the same as to their true character, origin or

source, shall, if said goods, wares or merchandise have become, or are intended to become, subjects of foreign or interstate commerce, be deemed guilty of a misdemeanor, and on conviction thereof shall be punished as provided in section four (4) of this act.

SEC. 7. That if any person shall brand, mark, stamp, stencil, label, name or describe any goods, wares or merchandise, or any package or wrapper containing the same, which have or may become subjects of foreign or interstate commerce, in such manner as may be calculated to deceive or mislead any purchaser or user of the same as to the true character of such goods, wares or merchandise, or as to the place where they were grown, produced or manufactured, or shall cause or procure the same to be done by others, or if any person for himself or as the agent or factor for another, or as a member of any co-partnership, or as a manager, superintendent, agent or representative of any corporation shall have in its possession or under his control any goods, wares or merchandise, which he knows or has good reason to believe bear any public trade-mark, or any brand, mark, stamp, stencil, label, name or description, in contravention to the provisions of this act, he is guilty of a misdemeanor, and upon conviction thereof shall be punished as provided in section four (4) of this act.

If your convention takes any action in this matter, I would be glad to receive two copies of the resolution adopted—one to forward to Mr. Seuerhering and one to keep for future reference.

Very respectfully,

GEORGE W. BURCHARD.

I thought it would be very proper to have this matter discussed before this Association; and I wish at this time to suggest that it receive the consideration of the Committee on Resolutions. I will file this with the Secretary.

I want also to suggest that those of you who have not copies of the report of last year now, that you come here to the desk and get them. I suggest that you write to the Secretary of the Wisconsin Dairy Association for a copy of this report. The Secretary of the Association, I think, is Mr. D. W. Curtis, of Fort Atkinson, Wis. Those of you who have copies of "Hoard's Dairyman" will find an article on "State Trade Marks" in the number of January, 1896.

Mr. Billingsley. Mr. President, I move that this matter be referred to the Committee on Resolutions.

The motion was seconded and adopted.

President Plumb. Another important matter that should come up before the general Association, and which will necessitate the appointment of a committee, is that which relates to legislative matters. I feel very emphatic upon the question of securing State aid for this Association. As long as I am a member, I shall never cease making my desires known of the necessity for us to receive State aid. The State Horticultural Society receives \$1,000 a year. They go to any part of the State they wish, and have whoever they want to address them, and have the money to pay the bills with. It gives them strength. I think a committee ought to be appointed by this Association, of persons who would be likely to get close to the legislative members, and insist in pushing the matter of appropriation. There is one thing which is absolutely necessary in order to get such an appropriation

through, and that is that this Association be heard from by the members of the Legislature. If the members of this Association will write to their Representatives or Senators, and do what they can, it will help us materially. If one or two men have to do it all, they will not gain very much. We must all try, for I think it is worth working for. We ought to make ourselves heard from; and I think we can. We should first get an appropriation to help ourselves. As the Legislature convenes next week, we ought to have a committee of three or five appointed that are willing to do all they can to help this Association. I would like to hear this matter discussed.

Mr. Stubbs. In order to get this properly before the convention, I move you to have a committee appointed, consisting of three, with Professor Plumb as President, in order to get a bill through our next Legislature.

President Plumb. I wish to suggest a change to that motion. In view of my relation to the State, it is not well for me to be an active member of that committee. I would not care to be named on that committee at all. I should not care to have my name mentioned in connection with it. That is not because I hesitate going before the members of the Legislature; I shall do as much work as ever; but as a State officer myself, I am positive that my being on such a committee would cause some comment, which might reflect upon the institution with which I am connected.

Mr. Stubbs. I shall withdraw the name of President Plumb, and let him suggest whoever he thinks proper.

President Plumb. Allow me to suggest that I would like to make it a committee of five good men instead of three. I wish somebody would make a motion to that effect.

The motion is made and the President calls for a discussion on the same.

Mr. Billingsley. Mr. President, Gentlemen and Ladies: I favor an appropriation for the State Dairy Association. I believe I was, perhaps, instrumental in securing the appropriation for the State Horticultural Association. The future of the dairy interests in this State is promising, and is important; and I think it is well to foster it. I favor an appropriation, but I am in favor of a beginning to enable this body to publish its proceedings and scatter their products over the State. We must have some help in this direction. Indiana is a very promising field for the dairy interests in the future; and as has been said heretofore, it has been the dumping ground for products of other States. I believe we should take that position to which we are entitled.

Mr. Gardner. Mr. Chairman: I believe I have no suggestions to offer more than to say that I think what has been said is in the right direction, and we should all take an active part in securing an appropriation, with as much help as possible, from the State Legislature in the way of assistance. We all feel the need of it; and can not do too much to further this cause, in whatever manner we proceed. The suggestions that have been made are all in the proper direction, and we ought to feel like taking hold and helping.

Mr. Moore. I don't know that I can say anything but that we shall have to work hard to secure anything this year. I shall do personal work in that direction. We will have to follow it up, if we get an appropriation at all. We ought to have it.

President Plumb. Question is now called for. Are there no further remarks? It is moved that a committee of five be appointed, and also that we shall endeavor to secure the placing of laws on our statute books that will be of benefit to the dairy interest.

The motion is carried by a vote of the house.

President Plumb. I want to name the committee on nominations now, and I will later name the committee on legislation. For the committee on nomination of officers, I appoint: S. B. Woods, O. A. Stubbs, Austin Roberts, Charles Benjamin and Mr. Gardner of Wabash.

Now is there any other business? I would suggest that it is a very appropriate time for invitations. If there are any here who wish to invite the Association to meet with them the ensuing year, let us hear from them.

Mr. Stubbs. On our letter-heads at our creamery, at Lewisville, Henry County, is that we have a grand future in the State. We invite you to meet with us at Lewisville, Henry County. We are situated on the Pan Handle Railroad. We are in a condition to accommodate the Association or we would not invite you. We will do all in our power to have a large meeting. We have within a radius of ten miles, nine creameries, and the dairy interests are receiving much attention. I would be glad to have you accept the invitation.

Mr. Moore, of Plainfield. I am one of the newest members of this Association, having joined since I have been here. I live at Plainfield, ten miles west of Indianapolis, on the Vandalia road. We have quite an interest in dairying in our neighborhood, and I think we can entertain the Association if you will come there. I invite you.

Mr. Gardner, of Wabash. In behalf of the city of Wabash and Wabash County, I extend an invitation to hold the next meeting at the city of Wabash. I can say, like Brother Stubbs, while we are represented in a creamery in our county, we are also represented in dairy interests. I think our town and its position to railroads would be very favorable in holding the dairy convention; and I extend to you a cordial welcome, excellent entertainment and all of those things that make up a satisfactory meeting. I would be very glad to have the meeting held at that place.

President Plumb. Let us hear from others. If there are none, we had better proceed with the program. I shall take the liberty of adjusting the program to the best advantage; and I think we will open the papers of the morning by the last one on the program: "Silos and Silage for Dairy Farmers," by Arthur Hoadley, of Ockley, Carroll County.

SILOS AND SILAGE FOR DAIRY FARMERS.

BY ARTHUR HOADLEY.

One of the first problems the successful dairyman must solve is the source from which he can get the most good feed for the least money. In my experience a good silo, well filled with good corn silage, is the best. Having decided to build a silo, one should estimate the size required for his use, then set about to build it. If to be in the barn, a square one is generally the best. If to be out of doors, I would prefer a round one, built of staves and iron hoops, with shingle roof and connected with the barn from top to bottom for convenience of feeding. If in the barn, as ours are, I would build with studding the required size, with matched lumber, and plenty of building paper and coal tar for filling. As to cost of silos, where no roof is required, I can build a good silo to hold 100 tons, for \$75, or 75 cents per ton capacity. Care should be taken to build as high as possible, as it gives more room for the stone foundation; it also gives greater weight in settling, which excludes the air better and insures good silage, and enables one to feed fast enough from the top to keep it fresh and free from mold, which is impossible where too large a surface is exposed. Care should be taken to locate the silo as near the feed mangers as possible, as feeding time comes twice a day, and a few steps saved each time will, in the end, amount to a great deal of time. We use the large field corn to fill with; prefer a variety that will mature by the first of September, so it can be scoured before frost; also in time to prepare the field for wheat. We plant for a crop of ears, only we put about nine to ten quarts of good seed per acre. Have been planting with a check row, but I am going to drill in the row. I think it will give a more uniform stalk and a better ear than to put so many grains in the hill. Everything should be in readiness for filling when the corn begins to glaze, and before the fodder begins to turn brown. A good cutter should be set ready for use; plenty of help secured in advance, and everything ready to push the work as fast as possible. Work should then continue until the silos are full; then they should be allowed to settle two or three days, then fill again. When the filling is complete, it should be leveled down nicely and well packed, and it is ready for use. If to be covered, we tramp it good two or three times a day for three days, then sprinkle with a barrel of water, and let it alone until ready to begin feeding.

Silos and silage have many advantages for the dairyman, a few of which I will try to name. In the first place it is necessary for a man who would be successful in the line of dairy farming to know what it takes to make a ration for a milk cow; he should know that the great bulk of his feed should be starch, and that he must feed about one pound of protein, with five pounds of starch for best results. One advantage of the silo is it enables one to save all of the corn crop in the best possible manner. It enables us to provide (with the aid of good warm stables) summer conditions the year round. It enables us to keep more cows in the same amount of land. It enables us to preserve that great bulk of starch in

the corn plant in a succulent state. The advantage of corn silage over corn fodder cured in the field is all in favor of silage. The loss of feeding value of silage, caused by heating and sweating, by actual experiments, is found to be an average of 12 per cent., and in some cases as low as 8 per cent., while the fermentation of fodder-curing in the shock is 15 per cent. With silage, the loss stops as soon as the temperature of the silage decreases, say at the end of three weeks; while that of corn fodder goes right on, soon reaching 30 per cent.; and from then to spring, if left out of doors and exposed to the storms, the loss sometimes exceeds 50 per cent. This does not take into account the waste in feeding, which we know to be large, especially in the butts of stalks, the richest part of the fodder; but impossible for the cow to masticate, so is lost—but in silage, all is consumed. Also the starch fuel in green corn, while of the same heating character as the material dried, does not have the same effect upon the system as does dry corn and fodder. Cows seem to stand liberal feedings on silage, rich in corn grain, for long periods without any damaging effect, while fed no more food units in dry corn and fodder seem to have more or less ailment and trouble with their milk secretory organs. Succulent foods, even if of a heating character, seem to have a relaxing influence upon the system of the cow, and relaxation is the most favorable condition for milk giving. In my experience succulent starch in the form of green fodder corn and silage is better than the same material dried. The New Jersey Experiment station found last year on an acre of fine, heavy growth hay, that they got about 1,500 pounds of actual starch; and from an acre of silage over 8,000 pounds were secured. That of the silage was just as good; went as far pound for pound as the starch in the hay. The starch in the hay was worth in the market a cent a pound; that in the silage cost about a cent for six pounds. The cow would want as much protein in the form of wheat bran and oil meal with the hay as with the silage. Why should the dairyman who wants to do his best, feed a food worth five or six times as much in the form of hay—why not feed silage? It costs no more to build a silo large enough to hold feed for 20 cows than to build room to properly care for hay to feed the same length of time. It is my opinion we can no longer afford to own large tracts of land, even to furnish all of our feed in the summer in the form of grass, which is liable to be cut short by a dry spell at any time; much less to grow hay to feed eight months in the year with. I am so thoroughly convinced of this that I have prepared silage enough to feed until time to fill my silos next year. It is true, I shall grow clover for a rotation with corn, and will have clover hay to feed with my silage, and will have permanent pasture for my cows; but I will have the silage to fall back on when the grass gets short, and the cows need feeding. It is less work to feed silage than it is to feed soiling crops, and I think it can be fed with less waste. Taking the figures of the Pennsylvania Experiment station as to the cost of beets and silage, we find that an acre of beets gave 1,829 pounds of digestible, organic matter, and cost \$56.07 in the pit; while an acre of corn silage gave 3,589 pounds of digestible organic matter, and cost only \$21.12, or less than half the cost of the beets, and gave almost double the amount of food units.

As to cost of my silage, as near as I can estimate, the ten acres cost in the silo \$100, and made about 160 tons. Adding interest on cost of silos and cost of insurance on silos and silage, the total cost of good, rich silage is less than 75 cents per

ton, or about one-fourth what the same amount of food in the form of hay would be worth at present prices. I see no reason why a man, even at present prices for dairy products, can not make some money if he is up to date all along the line and will reduce the cost of production all he can. The manufacturer is striving all the time to get cheaper raw material. He does not pay a cent a pound for material when he can get five pounds, just as good, for the same money. The same thought and good judgment, if applied to dairy farming, will, in my opinion, make a success of it.

It has been claimed that silage is not healthy for the cow; that it did not make good milk and butter. Taking the opinion of Professor James Law, of Cornell, who says good silage is one of the healthiest of foods; when we consider there are 60,000 dairymen and stockmen all over the United States feeding silage, and that the 10 cents-a quart milk that goes to New York City is supplied by silage-fed cows, we can no longer doubt its being a good, healthy food, and in my opinion there is nothing that will help the dairyman along in the near future as much as will the silo.

DISCUSSION.

President Plumb. This question is open for discussion. I would like to ask Mr. Benjamin to open this question. He has had some experience with silos.

Mr. Benjamin. Mr. President, you are mistaken; I have had no experience.

President Plumb. Am I mistaken? Yes, I am mistaken; I will take it back; I don't want you to open the discussion. Mr. Moore, can't you open the discussion?

Mr. Moore. I had rather not.

Mr. Hadley. Mr. Chairman: What has been said has been well said, and I see nothing that need be said further. I accept it all. I have been using silage for I don't know how many years—seven or ten, I suppose—and find it very satisfactory.

Mr. Huseleman. Mr. Chairman: The discussion is open now, I believe. I want to talk about five minutes. I have talked here at our institute; I have talked for and against silage, I guess. I find that in order to get discussions we have to make statements that are contrary. Now, Mr. Chairman, I shall lead in the building of a silo. I have tried many ways of reducing expenses. This is my first year with a silo. I built a stave silo 14 feet in diameter inside and 25 feet high. I put twelve acres of field corn in it. I know how to make sauer kraut. We went at it, and I made my tub full of "sauer kraut." We put it in when there was no dew or rain on it. The first of December I commenced feeding it. I was away from home a few days about that time, and told the boys not to open the silo un'til I came home. I wanted to have the assurance of feeding the first feed to the cows. The first of December we began feeding it, and I am satisfied with the results. I don't see any reason why they are not a good thing. The cows seem to do well on silage, and it is a very cheap feed. I might take a moment's time to say something about the cost of the silo. We bought our staves in Chicago, already dressed. The entire silo building cost us \$103.45. The silo cost us about 75 cents per ton. As I said

before, we put twelve acres of corn into that tub. My wife helped me. She said to me that there was not corn enough raised in Dekalb County to fill that thing. We had fifty-five acres of corn growing on the farm, and I told her we could put all that in, and if it was not enough we would buy some corn. I don't know how long it will feed our cattle, but I think until the last of March. We have thirty-five head of cattle—twenty-eight milch cows. The trouble is we can't get them to eat anything else. I want to know how to get them to eat something else beside silage. We put salt on other feed, and then they will not eat it. They won't eat hay at all. They take their noses and throw it out of the manger. We can't get them to eat anything but the silage. We have tried to get them to eat every other kind of feed. They are looking well. I told the boys to give them silage as long as it lasts, and when it was gone they would have to eat something else.

When we went to build our silo we hardly knew where to build it. We were going to build it outside, and we studied a good while how we would attach it to the barn; so we decided to build it just outside of the barn and lay the floor level, so we could run our feed car out at the side. We have a box on wheels that we call our feed car. It is not very much trouble to feed. It does not give us so large a flow of milk nor as rich milk as the feed that we have been feeding for the past twelve years. The milk we get from the silage is not as good and not as rich; and I hear many dairymen complain that their cows do not give as much milk when fed on other feed.

Mr. Woods. Great minds will differ, as far as knowledge of milk is concerned. I was shipping milk to ————— at Chicago (and he knows his business). He told me I need not ship any more to him; I wanted to know what was the matter; and he said: "I am getting the balance of my milk of Oltman Bros. They feed their cows silage, and they make excellent milk." I was then feeding my cows sweet corn. About the next year I built a silo. It was four years ago, and it held one hundred tons. It was a very strong and a very good silo. I had good success that year; so the next year I built another like it. I have one large enough now to hold feed enough to feed in the summer time, in July, August and September, when the pastures get dry. Silage is good for milch cows and good for everything. It is very good for calves.

Mr. Husselman. Do you feed before or after milking?

Mr. Woods. We feed after milking in the morning and before at night.

Mr. Billingsby. I have been using a silo for about two years; this is the third year. I have been well pleased with it. I have not experienced the change in the milk referred to by Mr. Husselman. We supply the retail trade in the city and have never had any complaint. I think our milk is just as good when we feed silage as when we feed other feed. We have a better flow of milk in the use of the silage. While there is not much difference, we could get green fodder; it makes a nice feed for cows, and they will give a good flow of milk when fed on green fodder; but it does require a great deal of labor. Silage is certainly a great deal cheaper so far as labor is concerned. I have never been able to put up silage for 75 cents a ton; I estimate it to cost \$1.00 per ton.

In regard to filling the silo: I wet down on the outside of the silage with water in order to wet the wood-work that come in contact with the silage. The

silage kept well right up to the wall. This year I have a water tank nearby, and I took a hose and run it from the tank to the silo and wet it all the time we were filling; and when we completed filling it, I wet down the top and let it stand a day or two: then we wet it again and tramped it. I covered it over with sheaf oats until I had them about a foot in thickness, and I then wet them down. In a little while the oats came up and we had a nice green pasture on top of the silage. I have not opened it yet. I have a great deal of green fodder and am saving my silage until March. I intended to build another silo last fall, and I am fully convinced it is the best thing I could have done; but I postponed the matter until this coming year.

Mr. Moore. I have been in the dairy business six years. It never gave me any satisfaction until I built a silo. I built one two years ago that was about twenty-six feet deep, and filled it with silage; and I have found it the best feed I have ever tried. I have no trouble in getting my cows to eat other feed. Sometimes I make a little feed of bran and oil meal and give them for a change. Last year my herd numbered twenty-two cows; at that time I was feeding them silage—and they averaged \$105 per head. I have not made my footing this year, but I think it will be equal to last year if not better.

I want to say that during the extreme hot weather I had plenty of bluegrass, but my cows would not go out and graze. I never find a good thing that I don't want to give out; so I will tell you what I did: I made a preparation that I anointed them with. It is composed of sulphur, lard and tar, in equal parts: I apply it to the legs and about the head and the flies will not bother them. They would stand in the barn the whole day before this: but after I apply this they will go out and graze like they would in the spring. My neighbor does not apply anything; his cows stand in the barn and mine go out to graze, and I get the milk.

I don't gather my corn until it begins to dent. I never have any to sour. I never could put it up for less than \$1.00 per ton. I can't get it in any cheaper; I have to hire my engine, and pay for the hauling and putting into the silo.

Mr. Husselman. Mr. Chairman: It ought not cost \$1.00 per ton. I didn't expect to say a word at this meeting; if I had I would have brought my book with me. We have our own engine and our own cutter. I don't know how much that costs; some say they pay \$5.00 a day. We employ two men to get the corn (twelve acres, and it averaged 80 bushels to the acre), and put it into bundles in four days. Two men load that and haul it to the cutter in four days. They haul it about 50 or 60 rods. The field is about 84 rods long, and the corner of the field is about 10 or 12 rods from the silo. We had two men and we paid them 75 cents a day and gave them their dinners. I didn't do anything but tramp the silage inside. Eight men were employed four days, and two teams four days; you can reckon the cost. It is not anything like \$1.00 per ton. Reckoning the labor at \$1.25 per day, and we have 32 days for one man, and one team eight days, which, at \$2.00 per day, would be only \$56.00. We do not know how many tons we put in; we filled it full; we put in twelve acres. If it would hold but 50 tons, it would be but a little over a dollar a ton. We used our own teams. The corn was down bad, and two men cut the twelve acres in four days, laying the bundles with tops all one way. The men would take the team and pitch the bundles up and dump them

upon the wagon. The man that fed it would carry it to the machine. The first day we cut one-fourth inch lengths, and then changed the machine to one-half inch lengths, and then to one-inch lengths. I believe the one-half inch lengths are the best. I do not know exactly how much money it cost us, but it hasn't cost us anything like \$1.00 per ton.

Mr. Moore. I estimate my silo at 100 tons, and it cost me \$60.00 to get it filled.

Mr. Roberts. My friend said that his corn made about 90 bushels to the acre, and he had twelve acres. How can they haul that much corn in two days? It took us longer than that. He surely has stronger men than we have.

Mr. Husselman. I am a sample of the kind of men that grow up there.

Mr. Hoadley. I filled my silo as near as possible in this way. We planted the corn about, I think, as we commonly plant it. We meant to put about five or six grains in a hill. It was checked 3½ feet each way. Two men did the cutting of twelve acres in three and one-half days, and three men did the hauling. We had two extra men in the field to help load, one man at the carrier to feed it, one man to level it down and tramp it. A man to run the engine, which cost us \$4.00 per day. We were putting up 160 tons, which we thought would cost about \$10.00. The corn that grew right by the side of our corn, and on the same kind of land, would be worth about \$6.00 per acre in the field, at the present price of corn. The corn that grew right by the side of it made about 60 bushels to the acre. That would be about \$6.00 an acre in the field. The silage cost us less than 75 cents per ton.

Mr. Billingsley. I do not dispute this gentlemen's word, so far as that is concerned; but I will tell you about my silo. It took three men six days to cut our corn and two to help load it; we run three wagons and filled it in about two days, and we had about all we could do to keep the corn to the carrier, and I saw that the boys didn't rest any.

There is one matter I would like to find out: My friend Husselman is a good sample of the northern Indiana man, but I would be afraid to let him do the tramping in my silo. The first year I put one man in the silo, but I could see in feeding the silage that it was not as well tramped as it should be. I helped tramp it myself the next year, and this year I put two men in there, and I kept my eye out to see that they were busy all the time. You can't tramp it too much to get it fully mixed.

The first year I made silage I cut my corn when it was barely out of the milk state; the next year I waited a little while longer, and this year I let it dent a good deal and begin to turn a little at the ends. Do not cut it too soon.

Mr. Roberts. Mr. Chairman: The first year we tried to fill our silo our corn got dry and didn't pack good. This year we had a field of early corn and we put in some of that, and our cattle did not eat that near so well. The best time is when the corn is just gone out of a good solid roasting ear.

Mr. Woods. There is a nicety about having it just right. If too green, it is not good; if too ripe, it is not good. I had some that was most too green and it moulded, but if it is too dry there is not enough juice in the cornstalk to preserve it right. As for covering—Mr. Billingsley said he took oats; I don't believe that

is as good as my way. I husk enough corn to make eight or ten loads and throw it out; when we get it as full as we can fill it, we lay these cornstalks on top. The cornstalks are heavy and make a good covering.

Mr. Starkey. I would like to ask if any of those who have had experience with silos have made butter from the cows that have been fed on silage, and what is the nature of the butter?

Mr. Hoadley. Last winter we made about 30 pounds of butter a week, more than it took to do us. We shipped the butter to Lafayette and got two cents more on the pound than Elgin butter was worth. The man that handled it said he couldn't do anything with Elgin creamery butter as long as he had any of my butter.

President Plumb. What effect does it have upon cream?

Mr. Hoadley. I might tell you that during the World's Fair a neighbor purchased cream of us to make butter to take to the World's Fair; and they got the first prize, and my cows were being fed at that time on ensilage.

President Plumb. I think we should close this and take another topic, unless you would prefer to carry on this one.

Mr. Hoadley. Mr. Chairman: I wish to say there has been just a little off flavor in our cream when we have fed before milking. We noticed it last winter and we traced it up to the cows that were fed last; so we took to feeding the ensilage after milking and with desired effects. About the covering of the silo—the filling comes just after the clover hulling proper. A little clover over the top makes a good covering.

Mr. Benjamin. On this question I fancy I see that the drift of the conversation is all in favor of it. Last week's Bulletin has an article in regard to the nature of the feed that fermented ensilage produces. I am a new beginner in the dairy business, and we have not been using ensilage. I would like to know if any one ever used green clover in filling a silo?

Mr. Hoadley. I never filled a silo with clover. I had some clover mixed with weeds about half and half. I stacked it out. It made a stack about 14 or 15 feet in diameter. Then, after we got the clover all on, we put two big loads of straw on that. I never had finer feed than that made. The stock ate it all up. The cows would get up to the top of the stack and come down. After that, I for two years took the floor out of my barn, which was 80 feet wide and about 30 feet high, and I filled that. It was most excellent.

Mr. Holloman. Two years ago I recall Mr. Hoadley; he was at our institute. He said he didn't believe as good butter could be made from it as from the feed he used.

Mr. Hoadley. I have not changed my opinion yet. I want to say this: While I joke a good deal at times, the fact is that unless you take the very best care of your cows you can't make good butter from any kind of feed. There is no man that can make as fine butter from ensilage as can be made from good, dry fodder; but one great trouble is that we don't give it enough care.

Mr. Isenhour. I have had a little experience with the feeding of ensilage. I filled a silo one year, and while I was feeding that I had trouble with my butter. I was doing a retail trade, and you know the people that buy butter that way

know what good butter is. While I was feeding that silage I had a good deal of trouble among my customers. I condemned it and am not filling it any more. I don't think there is any man on earth that can make as good butter from ensilage as from other feed. He can take clover hay and green fodder and make lots better butter; I am satisfied of that. I talked with Mr. Furnas about it. I asked him how he was getting along with the cream he was getting from the silos, and he said he had a good deal of complaint. He said: "I have had a good deal of trouble, and have to sell some of my butter for 8 cents a pound. That is what I get from the silos." They will do for milk, but for butter I am afraid of it.

Mr. Roberts. Mr. Hoadley just told us he sold the cream to make butter that took the premium at the World's Fair. I think it is a fact that our creamery and other places around take butter to Indianapolis every week. I do believe it is necessary for them to properly handle it, which milk has to be if it is possibly fit to make good butter.

Mr. Hoadley. Unless you give milk the best of care there is no man that can make top butter from food of that kind. It must be good ensilage, not rotten or sour. But if you have good ensilage, perfectly good, sound and sweet, and feed it at the right time, have good cows, and give the milk the care that it should have, you can make good butter.

Mr. Wellborn. A late report from Mr. Furnas would show that he has changed his mind in regard to the silo. He decided that cream separated by the separator was a failure; but later on he likes that cream better than any cream that he receives. If I could have good green fodder, like it is in October, I would not care for a silo; but just think how many shocks of fodder would be left standing out to get dry.

President Plumb. In the leading dairy States in the Union the silo has had an extensive growth. In Wisconsin to-day, one of our great dairy States, where they export large quantities of butter, there are hundreds of silos; and if we could go into a convention in Wisconsin or some other dairy State we would find large quantities of silos owned by the people. We have not tried it enough in Indiana yet.

Mr. Billingsley. There is just one point in this matter that I wish to speak of, and that is the sweet silage. I make it a rule to have everything clean. The cows will eat anything; whatever you put into their mangers they will eat. You must keep out all bad silage, otherwise you will have trouble with your milk and butter. How will you keep silage from freezing?

Mr. Hoadley. My silage has never frozen, but I don't believe it would hurt it to freeze some.

Mr. Woods. I would like to ask about the empty silo. Is it possible that silos standing empty would not shrink up and not be air-tight?

President Plumb. You can see big holes in Mr. Polk's silos at Greenwood.

Mr. Billingsley. I don't think that Mr. Polk's silo is anything to be governed by. If you will pack it well it will do. That is a French method of saving silage.

Mr. Hussleman. I am afraid that saur kraut barrel will fall to pieces and the hoops come off. I will tell you how we fix our silo. Our bottom hoop is three feet wide. We got four-inch poplar boards and bent them all around the silo and nailed them there, so the silo can never twist or get out of shape.

Mr. Woods. Did you apply any tar?

Mr. Husselman. Not any all the way up; I applied it part of the way.

President Plumb. If there is nothing further to be said on this subject we will stand adjourned, to meet at 1 o'clock instead of 1:30, so we will get through sooner.

WEDNESDAY AFTERNOON

President Plumb. The first subject this afternoon will be "How to Make and Sell Gilt Edge Butter," by Mr. C. B. Benjamin, of Leroy, Lake County.

HOW TO MAKE AND SELL GILT EDGE BUTTER.

BY MR. C. B. BENJAMIN.

An article upon the subject assigned strikes me rather flatly, as I am trying to produce something of the sort upon a farm without all the modern, high-priced utensils; hence will merely open a chance for discussion, by which I expect to gain more knowledge in the making of gilt edge butter, which is first nature to some of us, second nature to few of us, and unnatural to many of us, especially to a majority of our farmers' wives, and why? Because there is a lack of painstaking somewhere.

Butter, of itself, a finished product of the farm, leaves many valuable marks of its existence behind, some of which have been previously spoken of in this meeting.

The name is general, but the product varies largely in regard to quality. When the "up-to-date" dairymen or women speak of butter, they mean it in its fullest sense, pure, clean, unadulterated, fit for any table in the State of Indiana.

To make such an article, especial care begins at first in the selecting of a bull. Get one whose ancestors are of the butter type, and breed your own cows, as this is the only sure, economic way to succeed. Much care should be exercised in the rearing of the best heifer calves.

After the cow is before us, feed her judiciously, all she will consume of a balanced ration, or in other words, a variety of sweet, clean foods, to make her produce all the butter fat possible. Neat, clean stables also have their place in this summary. Keep them in such a shape that if at any time a customer happens in you will not be ashamed to show him the herd and their quarters.

Now we are ready to milk, using all the care and diligence possible to keep the product as pure as when drawn from the fountain head, the queen of the farm. All bad odor is undesirable. Let the milk be quickly drawn and quietly removed to a place of cooling, and here another luxury becomes a necessity, in the making of good butter—the wife. See that she becomes interested, call it our milk, our butter and our receipts, and by all that is good and great, let her have free access to as much of the pin money as you do. No true, honest dairyman can do otherwise.

Let the skimming be under her supervision and the ripening and temperature of the cream, then our assistance is needed during the churning and washing, when it is again turned over to the handy and adept hand of the ever faithful housewife of the successful dairy, who salts to suit the taste, and puts up in parcels to suit the eye of the customer, who is given the benefits of all doubts as regards weights delivered at their door when wanted, by some one cleanly dressed, courteous and polite.

Now just a word about selling. It is easy to sell, yet not so easy to keep selling dairy butter to private families, unless you make a uniform article. Have it neat and cleanly put up, and to do this all along the line needs care and personal attention of all connected, especially the joint managers.

Sell to the very best customers your town affords, let them try your butter gratis, and, if it suits, make the necessary arrangements, they giving so much per pound the year round, or any other satisfactory way, bearing in mind their wants should be catered to if you would continue in the business.

President Plumb This paper is open for discussion; I would like to call on Mr. Husselman to open the discussion.

Mr. Husselman. Mr. Chairman, I agree with everything that Mr. Benjamin said except one thing, and that is—that the wife should do the skimming of the milk, and the selling, and the working the butter. Now that carries with it the washing and a great many other things that the wife ought not to do. Every man who makes dairying his business should do all such things himself; and not only allow the pin money to go to his wife, but turn the pocket book over to her!

We are to understand that it is an entire impossibility to make good butter without good milk. I want to talk to you on the subject that was presented last night—that bacteria in milk can carry disease. If we give milk the very best of care, in fact in the very beginning even in the feeding and the watering of the cows, it is not impossible to make a gilt edge article. I think that many of the failures of making the gilt edge butter are due largely to the carelessness of the man. The same ingredients are in it to-day that were in it during the time of Adam. I imagine that the milk that was first churned by Adam (and he strained it in a gourd, through a bluegrass straw) didn't have any bacteria in it. The cow was fresh from the hands of the Creator. She had never been housed in any stable; everything was new and fresh from the all-wise Creator. We think that man is largely to be blamed for the things laid upon the little bacteria. If we treat the cows kindly, give them the best of care, they will love us and give us nice, good milk.

Mr. Latta. I want to say that I believe that sunshine in the stables had much to do with the color of butter. Since then, I believe that scientific men have found that out. My father used to say that the blind hog found the good corn when the well one could not.

Mr. Husselman. A few years ago I sold a cow to a cousin of mine. He had an old barn, full of cracks, and he kept that cow and some others hovering in there; and he complained that the butter was white, and said she was not as good a milk cow as he expected. I bought her back of him and put her into a good light barn, and turned her out when there was a day fit; and I saw she made good

yellow butter. I told him he didn't treat her right was the reason her butter was not yellow when he had her. A good many dairymen tell us that you want to keep your cows in a stable from the first of October to the first of May. I don't believe it. We should not keep them housed only when the weather is unfit to turn them out.

After the butter is churned it wants to have the right kind of care. It should be cooled at once. I prefer the use of ice instead of the aerator system of cooling. I believe you can make a better quality of butter by using ice than by using the best aerator that "Star" ever made. The mistake is that they do not give the milk the care they should. If you want to set cream for the purpose of making butter, put it on the ice as soon as possible. Have it in a deep can of ice as soon as you can; you can raise all the cream in three hours. Keep that cream perfectly sweet until you have a churning. You must churn every day or every other day. My mother used to make as good butter as you can make now. Our butter sells at the top of the market. Milk should be churned at a uniform temperature, and should be cooled down as quick as you can make it without having the ice come in contact with the butter. I am going to make it to suit my customers. If it don't suit them they will not take it. That's why I have been a failure as a peddler. If anybody didn't want what I had to sell, I would just shut the door and go on. I would never coax them to buy.

Some one asks, "What will become of our dairy products?" It is not a question of demand for the article, but it is a question of whether or not we can supply it. You must turn off many customers during the year if you make too small amount of an article to supply them. When I commence selling milk, and I can't supply the customers in the city of Cleveland, I will write back to you and you will let me have your butter, and I will pay you the price you ask. The only way to establish a reputation is to make people think that you are making the best butter that they can possibly get; to have them come to the farm and see that you have everything as neat and clean as they can be found anywhere, and they will be satisfied that the product you are making is as satisfactory as can be made. There is always room at the top; it is at the bottom that they are crowded. As our President has well said in our presence last night, Indiana is, without a doubt, the best place in the United States for dairying. The one thing that I regret is that so few women and men see their opportunity. The greater the demand for that article the better the price we will get for that article. You create a demand for an article and that is what everybody is going to buy. If you want to buy horses you go into a country where they have the kind of horses you want. If I wanted to buy Berkshire pigs, I would come to Boone County. If I wanted to buy potatoes, I would go to Michigan. I want to go where the most is produced. And so it is with the butter interests. If we would produce in Indiana as much again butter as we produce now we would have better markets than we have now. I really believe that there is no danger of an overproduction on that line. I can make more clear money by making butter at 15 cents a pound than I can make by raising wheat and selling it at 50 cents per bushel. Wheat growing and corn growing do not build up the man like the breeding and caring of stock. I thank you for your attention.

President Plumb. You remember Mr. Husselman said he often stood on the wrong side to evoke an argument, and that is what he intends in this case.

Mr. Husselman. There is one other place where I differ from Mr. Benjamin. He says, as soon as the butter comes in the churn you should cool it as soon as you can. My experience is that it destroys the flavor. I would say, keep it just as warm as you can to keep it in a granular process.

Mr. Smith. After butter is churned and the milk is ready to draw off, I prefer heating it, rather than cooling it. If you will heat it a little it works better and is much more satisfactory in handling after it is worked. Before churning we make our cream about 66 or 68 degrees. The different herds vary very much in that respect. Some have herds that they say if they warm the milk to 66 or 68 degrees, the butter would be so soft that they could not handle it. When we want our butter to do well we heat it up to about 68 degrees; then I churn it and warm the water that I wash it with to about 65 degrees; then I wash it through another water and salt it and work it, and by that means we can handle our butter satisfactorily. You can not ball up butter when it is too warm. We have two big springs. The water is forced in our milk house by hydraulic pressure. We strain our milk into the cans in the creamery and the water gets around it all the time. That water is about 52 degrees. As soon as we get our churning right I heat the milk up to about 68 degrees, and then we churn. So far as the feed of the cows is concerned, I never found anything better than bran or shorts. I think that is the best thing to make good butter.

Mr. Isenhour. I take objections to the warm water and ice both. This last summer I tried ice, and I find that it ruins the flavor of the butter. And as far as the warm water is concerned, I don't think that is good either. My plan is to churn at about 63 or 64 degrees. I find the best way, on drawing off the milk, is to then apply cold water. My plan is to run it through brine and afterwards rinse with clear water. By running it through the brine water it gets the buttermilk all out.

Mr. Johnson. How do you get it in granular form by churning at 64 degrees?

Mr. Smith. It will churn that way. In some herds the cream will bear greater temperature than others. When I first began in the business I used shorthorns. I hardly ever raised the cream to more than 62 degrees, and it would be warmer than the herd I have now at 66 degrees. It has to be different. I have sold about 5,000 pounds of butter this year. I have the same customers that I have had for ten years.

Mr. Johnson. Didn't you lose by churning it at so warm a temperature?

Mr. Smith. No. We can't get it so well at a lower temperature.

President Plumb. We will now have some music. The musicians didn't know we were going to begin so early this afternoon, so they have just come. But we will have some music anyway.

Music by Ed. Lane and Charles Marvin.

President Plumb. I think we will never be favored with better music than we have had at Lebanon this year. I have never heard any instrumental music at our meetings that could beat it. I want to appoint the committee on legislative

work at this time, and will appoint Mr J. J. W. Billingsley, chairman; Mr. O. A. Stubbs, Mr. S. B. Woods, Mr. Moore and Mr. F. P. Johnson. I have had the assurance of each one of these gentlemen that they will put forth their best efforts in the work they have been appointed to. The regular program calls for the election of officers, but the committee was not ready to report at that time, and before taking up the next paper I will ask the committee if they are ready to report now.

Mr. Woods. Mr. President, as chairman of the committee on nominations I beg to submit the following report: We were assured by the present incumbent that he would positively decline the nomination for president, and so have selected the following men: For president, Mr. Otis A. Stubbs; vice-president, Mr. Charles B. Benjamin; secretary-treasurer, H. C. Beckman; executive committee, Mr. J. M. Knox and Mr. J. S. Moore, in addition to the regular officers.

The report was adopted as read.

Mr. Benjamin. I want to know about the place for holding the next convention. There are three places under suggestion. I would suggest that in place of my name on the executive committee we insert an executive from Wabash. That would give a fair representation. My idea is to lay the thing before the executive committee, that they may get something out of the membership. The one getting the largest number of members for the ensuing year gets the convention for the next year.

Mr. Roberts. I suggest we appoint Mr. Benjamin as one of the committee. The fact that he is up there is one thing that the committee had in mind. We can't have the interest divided, and he would act on the committee the same as those other gentlemen. The committee would be glad to have him stay there.

President Plumb. We can't afford to nominate a member of the executive committee from each of the towns. I think it might be well to have a vacancy left to be filled afterwards. If there is a working member of the Association in the town where the Association is to meet, he might fill the vacancy. He would surely be ashamed of himself to have the Association come there and not do anything.

There is one thing which I wish to bring before you: In case of this Association receiving any aid from the State, it will be necessary that we become an incorporated association. I therefore request you to consider the appropriateness of giving some authority to the incoming members or officers, to incorporate the Association.

It would be necessary to do that through the Secretary of State. We have with us Mr E. G. Potts, of Indianapolis, who wishes to go away on the next train, and I take the pleasure of introducing that gentleman to you, who will discuss the subject of

SUGGESTIONS TO THE PRODUCER BY A COMMISSION MERCHANT.

BY MR. E. G. POTTS.

I see it announced on the program that each paper is open to discussion. Discussion assumes that there shall be a negative and affirmative side to the question. I wish to state right here that as there can be no possible defense for this paper, there can be no discussion.

Some time ago when our friend Plumb sent me an invitation to read a paper before you, he said my time would be limited to 20 minutes. A man should exhaust his subject, but if friend Plumb expected me to tell all I don't know in the time stipulated, he made a great mistake.

The relation between the producer and the commission man should be of mutual trust in order to be of mutual advantage. While the producer may not learn very much from his commission man, I am free to state that the commission man or dealer can nearly always learn something to his advantage from the producer. Especially is this true when it comes to methods of packing produce for the market.

I well remember the lesson I learned several years ago on the subject of fresh eggs in the winter time, when fresh eggs are scarce and command a high price. I learned my lesson from an honest farmer—a producer in the sense the term is used here; and on this particular lot of eggs we lost money. This farmer had what we call a good bunch of eggs. There were more of them than any one man could reasonably be expected to have at that time of year, but I didn't think of that. We were short of eggs, and the way I took in that opportunity did the farmer good. I jumped at it. Some time after the deal was closed, and Mr. Farmer was well on his way home rejoicing, our egg candler came into the office and informed me that those eggs were limed.

It is true that the process of preserving eggs by lime was discovered more than a hundred years ago, but I was young and that, among a few other things I might name, was one on which I was not posted. It is a common fallacy that the farmer goes to bed when it grows too dark to work. But don't you believe it. In the long winter evenings he is snugly ensconced before the open fire, with a pitcher of delicious cider on the table at his elbow, and while the good wife is resting herself knitting or putting a patch on John's trousers, where it will do the most good, or doing some other good and useful thing, he is thoughtfully pulling at his favorite pipe and studying or reading up schemes.

We sometimes hear expressions of dissatisfaction from our trade at the way apples are packed. They don't hold out all the way through the barrel as fair as they promise on the top layer. We have suggested to more than one shipper that it might be a good thing to do to distribute some of the large smooth apples through the barrels, or put a few of them in the bottom of the barrel, so that a pleasant surprise might be in store for the consumer when the bottom was reached.

In some instances this result has evidently been reached by turning the barrel bottom upward, and commencing to pack at that end; but we always find the stencil on the bottom where this method has been adopted. I might name numerous other instances illustrating methods of packing produce, but will turn to the manufacture and sale of butter—which pursuits are so singularly free from influences of this kind.

Here the relations of trust and confidence between producer and seller are of great importance. The producer needs the commission man as much as the commission man needs the producer. Perhaps some of you would like to know the name of a first-class commission house in the Indianapolis market, and I regret that one of my partners is not here to recommend one to you, as my native modesty will not permit me to advise you in the matter. I have two partners, and neither one of them is troubled with either the native or imported article.

My belief is that good butter makers, like poets, are born—not made. There is a kind turned out in grists, like medical or dental students, to practice their arts on an unsuspecting public. A sort of free coinage of butter makers, as it were; and the butter they turn out is fearful and wonderful to behold.

You all remember, no doubt some of you with a feeling that is akin to pain, a sort of dysentery of the pocket book, if I may be pardoned the expression, the avalanche of creameries that fairly swept over our State a few years ago, when a certain enterprising firm from Chicago sent missionaries among you to tell the glad story of how to get rich by investing in one of their \$5,000 creamery plants, and agreed to furnish a practical butter maker from Elgin to run it.

There were enough creameries established in Indiana to almost supply the markets of the entire country, and enough butter makers engaged to run them to depopulate the Elgin district. Some of these creameries were started in rich dairy communities; had an ample number of patrons, supplying an abundance of milk, in fact, were well equipped with everything needful except brains. The idea seemed prevalent that the creameries could get along without the commission man or wholesale dealer, and that they could supply the trade direct with their product. Some of them would send their president or secretary, or some other officer (for they were all as amply provided with officers as a home militia company, who often outnumber the privates). Well, they would send their officer to the city—say to Indianapolis, to look for customers. Occasionally he would call on a wholesale dealer and allow him to smell the odor of his ten cent cigar, and to admire his handsome watch chain and other accessories that go to make up an officer of a flourishing corporation; get a few hints, if possible, as to the state of the market, etc., but when the subject was broached of shipping his butter either on commission, or to sell to the wholesale dealer, he would grow haughty, or demand Elgin prices or more for his butter, and upon the suggestion being offered that his butter was not good enough, perhaps, to command Elgin prices, he would spring the Elgin butter maker on his hearer. This would be taken as a patent of quality and perhaps a sample order would be given him, that if the goods proved satisfactory a contract could be entered into for his entire output. In very few instances was a second order given. The first shipment would end negotiations.

More often, however, the agent of the creamery would go about to the retail trade, take a few orders at the same price he offered the wholesale dealer, or less, deliver it sometimes free of charge at the depot at Indianapolis, then come to the city the following week to make his collections. Sometimes he gets his money on the first trip, sometimes he never gets it. The Elgin butter maker could not put up the right kind of goods. The creamery would reduce their paying price for milk. They would lose their patrons. Then after a while there would be a creamery for sale.

These criticisms that I am making, of course, do not apply to you, but to the butter makers in the next county. It should be the aim of every creameryman to make a superior article. The main object in view should be to obtain a high, quick flavor. Flavor will go further toward selling butter at a high figure than color or texture, though both latter qualities are highly important. Butter makers are to blame for allowing their standard to fall instead of keeping it up to the highest mark possible. Strictly fine butter will sell itself, but poor butter (and there is a great deal of poor butter made) is hard to sell; does not give satisfaction to any one handling it, and is unprofitable. It costs nearly as much, and sometimes more, to make a poor grade of butter than it does to make an article that is not only above suspicion, but above criticism.

The requisites for good butter are good cream and acquired skill. With one of these lacking it is impossible to accomplish the desired effect. Cleanliness is another most important factor.

You hear sometimes of a dairyman bragging about his supply of clear, cold water. It is just as important to have hot water, and you can't have a clean dairy or creamery without the free use of hot water. Nothing is so easily affected as the flavor of butter. Sour, unclean utensils often are the deciding factor as to whether the butter is good or bad. Thousands of dollars could be saved by dairymen and creamerymen if greater attention was paid to cleanliness.

The expert butter buyer detects the defects easily, and the butter maker wonders why his product does not bring a better price. A couple of cents off per pound amounts to a good many dollars in a year's time.

Then there is prodigal waste going on all the time unless a keen eye is kept in this direction. The sharp competition and the prices prevailing make it imperative that the constant little wastes be prevented. There is a steady stream of butter fat going to waste from the time it leaves the cow until the finished product is ready for market. Then there is the cow. You will remember the description of the cow in the boy's composition: "The cow has four legs, one on each corner, and a tail at one end and horns in front, and is a hairy beast." Some dairymen are satisfied if they have a beast that fills this description. A large proportion of the cows used for dairy purposes don't pay for their keeping.

The dairymen and creamerymen are an exceptionally fortunate class. To the practical man in these industries there should be no hard times. With proper care and close looking after the little details that go to make up his business, he can, if he will, earn a larger profit on his capital than any other branch of rural pursuit. I quote you from an article in the Elgin Dairy Report of September 21 of the present year, discussing the enlargement and growth of the dairy interests,

in which it was suggested by a prominent creameryman that the farmers were not improving and increasing their herds. That, in fact, they were neglecting quality and also disposing of their young stock rather than continue in the dairy business, and that it was only a question of time, unless prices improved, when dairy sections that are now good milk producing sections, would be turned over to stock breeding or general farming, and that in this way there would be a tendency to decrease the production of butter, and thereby increase prices. We scarcely agreed with him. Even at the present low prices of butter and cheese, there is no branch of farming that will give the farmer as good returns for his work or for the feed that he runs through his milk producing machine, the cow; and as long as these conditions prevail, we see no reason why the intelligent, wide-awake farmer should change from the dairy business to general farming.

With increased population, and with reasonable economic conditions prevailing, the increase in the consumption of butter and cheese will be greater than the increase in production. Take, for instance, the metropolitan district of New York City, compared with the population, the increase in the consumption of dairy products—creamery butter, cheese and condensed milk—has been very much greater. And it is a notable fact that in that district the increase in consumption of fine dairy products has been larger in proportion than of any other product; showing that as the people grow accustomed to better grades of cream, butter and cheese, they use more in proportion than they do in communities where they are not accustomed to and can not get a regular supply of such articles.

The farmer is situated differently from the manufacturer, who, when prices are too low, can shut up his factory and discharge his help, thereby cutting off expenses. The farmer must plant his seed, grow his crops and milk his cows, and take his chances as to whether the products will bring cost in the market or not. He can not stop, for if he does, all increase in productive capacity stops.

I also quote from the "Creamery Journal" on the subject of "The Future Creamery." Some of these remarks may sound utopian, but nevertheless I believe they are suggestive of good. They are in the nature of prophecy, as follows, and will make the cold chills chase up and down the spinal columns of some creamerymen as they mentally compare their condition and prospects with what will be the outcome of their business when the "Future Creamery" is an assured fact. Some day, some where, a man with brains, and an air of cleanliness about him, and with business in his eye, will come along and locate in a community where creameries are owned and operated by farmers, who think that anything is good enough for a creamery, and this clean, shrewd business man will build a creamery so fine in its appointments from garret to cellar that it will make the other creameries look like soap factories. He will adopt modern ideas of the best posted men in the country. He will have tiled floors, an office for the butter maker, and the butter maker will not have to run the engine. He will have a laboratory for testing milk. Perfect drainage and perfect ventilation. He will have a clean gravel, macadam or cement driveway for the milk wagons, and a lawn that will cost a few hundred dollars kept close cropped and clean. His butter maker will have to know his business from a practical and scientific standpoint, and the man at the receiving tank will have the power of a czar. Bad milk will be sent back to the

patron with crape on the can. This man will be called a crank. But he will prosper, and his competitors will stand aghast and wonder at his success, in the face of such extravagance. He will succeed because he will turn out a superlatively fine article of butter.

I will close by leaving a problem with you as to why there is not more first-class cheese made in Indiana? It is as profitable as butter, and could, at certain seasons of the year, be made more so. Yet, year after year, the dealer has to go to Wisconsin for a fair article of cheese, and to New York State for a strictly fine grade of full cream goods. Why can't we get it here at home?

DISCUSSION.

President Plumb. I don't believe in telling any personalities, but I want to say to you, and to some of the younger members of this Association, that when this Association was in Mr. Potts' town he manifested a great deal of interest in it. I felt that in inviting him here, that we were inviting some one that would add a great deal to the interest of our Association. I trust that you will ask him some questions.

Mr. Roberts. He seems to think we are all right. I would like to ask him if all other commission men, except his two partners, are as honest as the persons he has talked about?

Mr. Potts. I still say there can be no discussion on the paper.

President Plumb. If Mr. Potts takes that stand, we shall pass on to the next subject. We will now discuss Mr. Billingsley's subject. I will call on Mr. Johnson to open the discussion.

Mr. Johnson. I had rather be excused.

President Plumb. We will hear Mr. Gentry then.

Mr. Gentry. I believe I have nothing to say.

President Plumb. If we can't get any discussion on this subject we will proceed to miscellaneous business.

Mr. Hadley. I just want to ask how Mr. Billingsley fills his bottles.

Mr. Billingsley. I have a tin measure made on purpose for that; it holds a little over a gallon, and that fills four bottles. We just fill that from the milk can and pour into the bottles and set into a cooling pan. This should be done as soon as possible.

Mr. Johnson. My plan of filling bottles is to fill them while the milk is warm from the cow and set them into cold water, and when they are thoroughly cold, seal them up.

In regard to running a retail dairy, you all know it is quite a burden upon one individual to manage the concern and do a great portion of the work himself. I have had a dairy for twelve years, and about a year ago I thought I would try a new plan. I hired a man to do my work for me. I furnish the house for my dairyman to live in, and he does all the work and pays me 12½ cents a gallon for the milk at the door. He leaves the management to me. We consult each other. He is very willing to leave the general management to me, and I am perfectly

willing to leave the work to him. We have been in business since September a year, and have never had an argument yet; and we have no written contracts. He is satisfied and I know I am. I believe that it is a better way to run a dairy than for one man to try to run it all himself, if it can be so done. Of course we are not all situated alike. I find it is a greater pleasure to me to run a dairy new than under the old plan.

President Plumb. We are now ready for the report of the Committee on Resolutions.

Mr. Sudendorf read the following report:

To the President and Members of the Indiana State Dairy Association:

Be it resolved, That the Secretary be instructed to request the Governor-elect in his coming message to the Legislature, to call special attention to the necessity of enacting proper laws to protect the dairy interests against the manufacture and sale of imitation dairy products;

WHEREAS, It is the opinion of the members of the Indiana State Dairy Association, now assembled, that the selection of a Secretary of Agriculture under President-elect McKinley should be made with a view to special fitness for the position; and

WHEREAS, We recognize in ex-Governor W. D. Hoard, of Wisconsin, a man of ability, who well understands the requirements of the agricultural interests of the country, as a result of years of study and close relationship with the farmers of this country; therefore, be it

Resolved, That we commend to the careful consideration of President-elect McKinley the candidacy of Mr. Hoard, and take this occasion to express our confidence in his ability, integrity and special fitness for the position. Be it further

Resolved, That a copy of these resolutions be mailed to President-elect McKinley and to ex-Governor Hoard by the Secretary of our Association.

WHEREAS, The Ways and Means Committee of the National House of Representatives having decided on a revision of the tariff on imports, and to assist them in this work, they give each industry an opportunity to be heard by a Representative or by a written statement addressed to the clerk of the Committee of Ways and Means; and

WHEREAS, January 5, 1897, being the day designated to hear claims for protection on agricultural and dairy products, therefore, be it

Resolved, That the State Dairy Association of Indiana is of the opinion that if wool is protected from foreign competition by a duty on foreign wool, then hides imported should be subject to and charged as high a duty as wool, in proportion to value, so that the cattle and dairy interests of the country shall be shielded from foreign competition, and in this way increase prices and profits to the producer. The cattle and dairy industry has claims for consideration, as it is estimated that there are in the United States 32,000,000 head of cattle (not including milch cows) and 16,500,000 milch cows, and yet hides since 1873, coming from all parts of the world, have been admitted free of all duty. And in regard to dairy products (butter and cheese) import duties on these are of very little account, as we have a surplus for export. Therefore, we ask that this industry be encouraged and

upheld by a bounty on butter, milk and cheese, and given to producers in the same way as it is proposed to be paid to the producers of sugar; and, be it further

Resolved, That a copy of this preamble and resolutions be forwarded by our Secretary to the clerk of the Ways and Means Committee, Washington, D. C.

WHEREAS; Your committee regrets to hear of the calling away of Colonel Hatch, author of the "Hatch law" in Congress, establishing agricultural experiment stations; and one of the most active champions of our dairy interests during the many years he served in Congress.

Resolved, That the Secretary be instructed to send a message expressing the hearty sympathy of this Association to the widow in her great bereavement.

Resolved, That the Association extend thanks to the citizens of Lebanon for the entertainment furnished, and for providing the use of hall; also to Mr. Knox, local member of the executive committee, for work done, and to the press of Lebanon and elsewhere for advertising and reporting this meeting; also to Professor Plumb and H. C. Beckman for their faithful services as President and Secretary of this Association.

FRANK P. JOHNSON,
J. V. SHUGART,
W. G. GARDNER.
E. SUDENDORF.

Mr. Roberts. I move that the resolutions be adopted as read.

President Plumb. I very heartily endorse the recommendation of ex-Governor Hoard as Secretary of Agriculture. I believe him to be a very broad man.

Mr. Billingsley. I have an objection to one resolution, however, with respect to bounty to be paid upon hides. Men who raise potatoes had as well ask for a bounty. If I had control of the resolutions I would strike out that point.

Mr. Woods. This resolution has been presented here with the object of showing the members of this Association what other associations are doing. Most every one is asking the government to protect them. The people who are raising hogs at the present time ought to have a protection to help them out, just as well as any one in the country.

Mr. Billingsley. There is this side of it; possibly those over the country who read this resolution will not see this side of it. I would introduce a resolution condemning the system of bounty paid. I don't like to have this Association to pass a resolution that reads two ways.

President Plumb. I wish to say a word in connection with this subject. This Association is non-partisan, and, therefore, on any attitude raised, we should never get partisan about it. The difference of opinion is based on bounties. We should all do as we feel will be of the best interest to the Association. It is not to the best interest to this Association to take hold of political matters. If I were chairman of an institute, I would rule such as that out of order. But I don't feel that I have authority to do that here; but I hope we shall not get into politics. I believe in politics. I believe in politics in one way in this Association; that is in the protection of our interest. This is simply a question of protection. If we are equally divided between protection and free trade, I am sure it will be a house divided against itself.

Mr. Roberts. If it is necessary, I will withdraw that motion and take up again the discussion.

President Plumb. I think we had better not let the matter stand as it is. I suggest that we vote on each resolution, and we can accept such as we wish.

Mr. Billingsley. I don't think that the movement is in motion to withdraw. I move to amend then by striking out that resolution that pertains to paying bounties.

President Plumb. The motion is that these resolutions be accepted, except that part that relates to paying bounties on dairy products.

Motion carried.

The clause relating to bounties is, therefore, struck out, and the balance of resolution is adopted as read.

Mr. Sudendorf. I would like to urge this Association to have the Secretary to send that indorsement to Mr. McKinley at the earliest possible moment. The sooner these resolutions get to him the better it will be for Mr. Hoard. That is very important.

Mr. Woods. Do I understand that you don't want any resolutions at all touching on the bounties?

President Plumb. I will read the resolutions again. [Reads.]

Now, I have not read these all over myself, and I did not see it all before. There are two parts in relation to bounties—that in relation to dairy cattle and that on dairy products. You prefer that dairy products be struck out only. I don't see any particular difference in the two. Do you wish this entire thing struck out, or that in relation to dairy products only?

Mr. Billingsley. I want that in relation to bounty struck out.

President Plumb. Those in favor of the acceptance of these resolutions here, except those in relation to paying bounty, please make it known by saying "I."

They are accepted.

Mr. Husselman. I believe we have a provision in the by-laws by which men can be elected to the position of honorary members in this society. I wish to nominate a man for that position. I wish to put the name of the Honorable James A. Mount.

Mr. Knox. I will state to the Association that I wrote Governor Mount a personal invitation to attend our meeting. He says that he regrets that his time is so taken up that he could not be here. But he is with the Association and willing to serve us in any way he can.

President Plumb. The motion is made and seconded that the Honorable James A. Mount should be a member of this Association. All in favor of this motion make it known by the usual sign.

He is unanimously elected.

President Plumb. We have with us Mr. Sudendorf, of the National Butter-makers' Association. Mr. Sudendorf is the Secretary of this Association, which is a very important one, and holds each year a meeting in the interests of the butter producers. I will call upon Mr. Sudendorf to talk to us awhile about their Association.

Mr. Sudendorf. I don't know, Mr. Chairman, that I can say much in regard to our Association that will interest you here. It is an association composed entirely of creamery buttermakers. It has a bearing upon your Association in this way—that in numbers there is strength. Our Association started five years ago with a handful of men, and we now have about 800 active members. I want to say for your benefit that our members pay their dues every year, whether they come to our meetings or not. It would be a good idea for you to do that. That is what gives us strength. Our meeting this year will be held at Owatona, Minnesota. We have a week's meeting, and there being large numbers there, we have the support of the opera-house and the railroads, and the newspapers also. We have in cash \$2,000 to be distributed among the buttermakers. I believe that every one who would come to that Association would be benefited. Everything will be larger than ever held before in this country. I cordially invite any dairyman to come and be with us. I think we will hold a whole week. I hope to see Mr. Plumb there, and all the other Indiana boys that will come. [Cheers]

President Plumb. There is one thing I wish to speak about, and that is the matter of taking steps to incorporate this Association.

Mr. Billingsley. I move that the incorporation of this Association be referred to the Executive Committee, with the power to act.

Motion adopted.

Mr. Roberts. I want, on behalf of ourselves and the officers of this Association, to show our hospitality to the Lebanon people for their kindness toward us while here, and also to meet them at our next session.

President Plumb. I wish to extend to the members of this Association my very sincere thanks for the many courtesies you have shown me since I have presided in the chair. I shall now go into the ranks, but at all times I will use my influence for the benefit of this Association.

We now stand adjourned sine die.

EXHIBIT OF DAIRY PRODUCTS.

The Executive Committee believe that an exhibit of butter and cheese in connection with the convention adds to the interest and at the same time is of a decided educational advantage. The Secretary was instructed to solicit special premiums from the several manufacturers and dealers in dairy supplies, and it is to their hearty coöperation and aid that much of the success of this new departure is due. Following is a list of the premiums offered:

Best tub creamery butter	\$5 00
To be divided on basis of score on all butter scoring above 85	10 00
Best five pounds dairy butter	5 00
To be divided on basis of score on all butter scoring above 85	10 00
Best full-cream cheese	5 00

The following is a list of the entries, with score and premium of each :

CREAMERY CLASS.	Score.	Premium.
Brunswick Creamery Company	97	{ Gold Medal Gold Watch \$5 00
Interstate Creamery Company	96	1 89
Farmersburg Creamery Company	95½	1 81
Wabash Creamery Company	95	1 72
Lewisville Butter Company	94½	1 63
Silas Holloway Creamery Company	94	1 55
John Mingle	93	1 38

DAIRY CLASS.		1 Gallon Color
A. F. Ward, Thorntown	91½	\$10 00
Stephen Ward, Thorntown	91	3 00
Sophia Riffe, Syracuse	90	2 50
Mrs. J. McFarland, Southport	89	2 00
W. S. Smith, Zionsville	88	1 50
Howard Johnson, Howland	87	1 00
Mrs. Perry Miller, Greencastle	85	. .

CHEESE.		
W. L. McCain, Hortonville	94	5 00
Lewisville Butter Company, Lewisville.	92	. .
P. G. Yoars, Amboy	90	. .

Wells & Richardson offer a solid gold medal to the creamery buttermaker scoring highest, using W. & R. color. Also one gallon butter color on the dairy butter scoring highest, colored with W. & R. color, and \$5 additional if this scores highest of all.

Worcester Salt Company offer a \$25 gold watch on the butter scoring highest, provided this butter is salted with Worcester salt.

Polar Creamery Company, Lafayette, Ind., offer \$5 in gold on the dairy butter scoring highest.

Fifteenth Annual Meeting of the Indiana Jersey Cattle Club.

The fifteenth annual meeting of the Indiana Jersey Cattle Club was called to order by the President, J. H. Matlock, on the evening of May 12, 1897, in the parlor of the Grand Hotel. The following members were present: S. H. Godman, D. H. Jenkins, H. H. Wheatcraft, J. M. Knox, M. L. Hessong, H. M. Baum, Samuel McKeen, W. S. Budd, J. H. Matlock, N. F. Shalter, Dr. G. V. Woollen, A. V. Bradrick, D. P. Shawhan, J. W. Bradrick, E. B. Price, Jno. M. Beckman, Wm. J. Davis, Conrad Jargins, Jno. E. Sheidler, J. E. Robbins, E. T. Shaffer.

The minutes of the preceding meeting were read and approved.

The Secretary's report of the past year showed cash record as follows:

For dues	\$45 00
Membership fees	10 00
Bosworth & Bosworth	12 00
Sale of herd register	4 72
	<hr/>
	\$71 72

The Treasurer reported as follows:

Received from former Treasurer, H. H. Wheatcraft	\$50 13
Received from Secretary, W. S. Budd	71 72
	<hr/>
	\$121 85

Paid to W. S. Budd, Secretary, for service	\$25 00
“ Grand Hotel for room	5 25
“ J. Ratti for printing	2 00
“ Jersey Bulletin for printing	11 50
“ Bosworth & Bosworth, expense of sale	23 70
“ W. S. Budd for expense	8 75
Balance in Treasury	45 65
	<hr/>
	\$121 85

This report was accepted.

The election of officers resulted as follows :

President—H. M. Baum, of Frankfort.

Vice President—May Harmon, of Greenwood.

Secretary—W. S. Budd, of Indianapolis.

Treasurer—Dr. G. V. Woollen, of Indianapolis.

Directors—Peter Raab, of Brightwood ; H. H. Wheatcraft, of Greenwood ; J. H. Matlock, of Wabash.

The Committee on Entertainment, consisting of Dr. G. V. Woollen, H. M. Baum and D. H. Jenkins reported, that they had prepared a banquet in the dining room of the hotel. Toasts were responded to as follows :

Welcome. By Mayor Taggart.

The American Jersey Cattle Club. Response by Dr. D. W. Voyles.

Our State Club. Response by George Jackson.

How to Conduct Jersey Sales. Response by Col. A. T. Dempsey.

The Jersey Cow. Response by Col D. S. Perry.

Our Neighbors. Response by Judge J. P. Bradbury.

The Professional Man in the Jersey Business. Response by Dr. J. L. Thompson.

How to Improve the Jersey Business. Response by D. H. Jenkins.

Dr. G. V. Woollen, Toastmaster.

The (17) Seventeenth Annual Meeting of the Indiana Bee-Keepers' Association Convention.

The seventeenth annual convention of the Indiana Bee-Keepers' Association met in the Agricultural Room. The President, Dr. Joseph M. Hicks, not making his appearance, and there being so few present, the meeting adjourned till to-morrow 9 A. M.

Pursuant to adjournment the convention met in Room 91, State House. The President, J. M. Hicks, took the chair and called the meeting to order. The Secretary read the minutes of the last meeting, and were accepted.

The cause of so few persons being present was partly owing to there being such a poor honey season in the year 1896 and the stringency of money.

ADDRESS BY THE PRESIDENT, J. M. HICKS.

To the Honorable Members of the Indiana Association of Bee-Keepers:

LADIES AND GENTLEMEN—I, as your President, would like to suggest several thoughts for consideration for our mutual benefit, among which:

1. It occurs to me that we all should try to economize our precious time to the best interests of each and every subject of importance to the bee keeper.

2. That in doing so we not only advance the best interests of those who keep bees for profit, but also those of every farmer and fruit-grower in the State.

3. Let me admonish you, one and all, that it is well known by many who have kept bees in years gone by, as well as those who keep bees now, that almost all the natural resources for bees have, by natural causes of civilization, been greatly and naturally lessened in our State; hence it should become a matter of interest to us all to look well to the best methods of furnishing the best means of supplying our bees with pasturage for honey. I have no fear of failure in keeping bees for profit if we have plenty of pasturage for them to work on. This can in many ways be supplied, both by the bee-keeper as well, many times, by his neighbors, and that, too, with double profit to both.

4. This now brings me to the subject I most desire for the greatest good to the greatest number, that of proper legislation by the law-making power of our State, to exempt bees from taxation, in order that we may as an organization try and induce more of our citizens to go into keeping at least a few stands of bees. It is a

well-known fact that at the present time there is not one stand of bees kept where there were at least fifty stands forty years ago in our State; neither is there one pound of honey or wax produced now that was fifty years ago by those of our primitive bee-keepers. I wish I could impress the idea upon this Association the great importance of having a full and careful report of the proceedings of this Association each year, so that they may become of more interest to each and every bee-keeper of our great State. It is a noted fact, as a practical illustration, that the county of Clinton now leads that of any one county in our State in the greatest number of hives of bees, there being within her borders one thousand nine hundred and ninety-eight stacks (1,998) or stands of bees, and yet there were in the same county nearly six thousand stands in 1856, and in Ohio County there were, in 1856, 1,239 stands of bees, and at present there are only 191 stands of bees. So it is today in nearly all the ninety-two counties of our great agricultural State, we find less than a fourth in number of stands or stacks of bees than was kept forty and fifty years ago, and I, as your President, feel it to be my duty to inform you of the facts, and, if possible, let us all put our shoulders to the wheel, and try to correct such mistakes by at least asking our law-making power to place all the bees of our State on the free list, so that every man, woman and child who may wish to have a few or many stocks may do so free of taxation. This, to my mind, would be quite an encouragement or incentive for all who may wish to again start, as well as those of us who may wish to increase our depleted members, and thus materially aid our agricultural brethren as well, who may be and are raising the various fruits of the State; and thus we become benefactors to each other's interest and greatly add to the material interest and wealth of all good citizens of each community. Last, though by no means least, of interest to this branch of our State industry, let me impress it upon each member here, as well as all who keep bees, the importance of having a stenographer or shorthand writer to take notes of such parts of our proceedings as are not written on various subjects and often delivered extemporaneously. As well, other subjects intimately connected with the interest of this society should be clearly and fully reported, so as to make our bee meetings of more interest to the general public, and in so doing I think we will get up an interest among the general readers of our State. With these few suggestions I close, trusting they may benefit all.

REMARKS ON ADDRESS OF PRESIDENT.

R. S. Russell, of Zionsville. I am greatly pleased with the President's address. The bee industry is dying out. Why the extremely hard times? The taxation or rather the assessing beekeepers \$1.00 to \$1.50 per stand, and other reasons, principally the scarcity of the flowers secreting the nectar on which the busy little bees delight to work.

The question was asked: Where do you get the law about who should keep Bees? Answer: No one should keep bees until *he* or *she* gets posted on the nature and habits of that very interesting part of Entomology, the honey bee. For the same law that governs the honey bees governs all insects.

WHO SHOULD KEEP BEES FOR PROFIT.

R. S. RUSSELL, ZIONSVILLE.

FELLOW BEEKEEPERS—The answer to the above query depends on so many circumstances liable to change the case, that it is difficult for me to classify all only in a general way in this brief essay. Therefore I shall give only the important requisites relating to the subject. Any person of ordinary intelligence may readily learn the habits and true character of the insect and the infallible rules necessary to success, without which no one should attempt to keep bees for profit or in connection with other domesticated stock, as trouble and even death are usual results, for while bees are the most intelligent of domestics they are also the most vindictive and sensitive to improper management of their keeper and will resent any misconduct about their home in the most violent manner and often with serious results to persons or animals not concerned in the case. Hence the condition of profit has long since been determined by the Supreme Court of Creation as well as who should keep bees, and while the beautiful flowers have been strewn plentifully over the earth and overflowing with richest nectar for all, only such as comply strictly to the letter of the law may keep bees for profit.

REMARKS ON ADDRESS OF MR. RUSSELL.

Dr. Hicks. The question, Who should keep bees? Every intelligent farmer, for without bees agricultural-horticulture business would perish.

For further enlightenment on this interesting subject, see "Shuckard on the Bee."

VARIOUS PLANTS AND TREES FOR HONEY.

BY DR. J. M. HICKS.

LADIES AND GENTLEMEN—I am not certain that I could enumerate even one-half of the various plants and shrubs that bees can and do gather honey and pollen from, but one thing I can assure you of, that their names are legion, and for me to attempt to enumerate all would be an endless task, and I fear you, as well as myself, would become very tired. But let me say the variety of plants that produce honey, and that the bees work on from early morn till dewy eve, it seems there is no end. For instance, here we have the turnip bloom, raddish bloom, cabbage bloom, beet bloom, potato bloom and the bloom of beans and peas, as well as cucumber, and all the various melons, squashes and pomegranates that we raise in gardens and fields. These as well as our garden sage plants furnish an abundance of honey and pollen for the bees. Neither would I have you forget that many of the beautiful flowering plants, such as holyhocks, roses, pinks, morning-glories and the jessamines, all so beautiful and nice to grow, and yet they all

furnish more or less honey for our bees. These are a few of the many I could name and enumerate, but must now go to the many other God-given plants, grasses and trees so richly decorated in proper season for the good of man. As well can I as truthfully say, here in Indiana we have trees such as the tulip or poplar, the hickory, walnut, oak, black and honey locust, also the various kinds of bass wood or linden trees, as well as cherry trees, both wild and tame, that the bees are fond of working on and gather a large amount of their supplies from in their season. I might go on and mention many other forest trees of great value to the bees, such as the yellow and black gums. But let this suffice, and we now will speak of the various field crops, as well as wild flowers, such as golden rod, rattle weed, often known as "Carpenter's Square" weed, and here comes the horse mint, catnip, hourhound, and many other wild mints that bees often work in their season. Now comes first in order the alsike clover, the alfalfa, also the crimson or Dutch clovers, all of which are grand and good honey plants. And since we, in the past thirty years, have added the Italian and Syperian bees to the list of our stock I would not forget the red clover, which has also been of great value both to the bee-keeper as well as the farmer who raises red clover seed for the markets. Then comes the *white clovers* frequently found growing luxuriantly on the commons as well as in fields, which is known to many of you as one of the best of honey-producing plants, and in some seasons will yield honey from the middle of May to the first of November. There is another beautiful flowering plant often found in flower beds and known as mignonette, of which there are several varieties, all of which produce a magnificent odor peculiar to its class as well as an abundance of honey of the finest quality and extremely healthful. Finally, allow me to say while I know of many plants and shrubs that are excellent as honey-producers, there is none that can excel alsike clover for yield or quantity or of quality, which to my mind is better than any other field crop for bees to work on and which is of the finest flavor and taste known to man. Not only so, but it never produces colic to the lover of honey, who may partake freely of the same, and as to keeping qualities there is no end, but will keep for years and be as pure and perfect as when first taken from the hive.

REMARKS.

Mr. Russell. The best honey-producing plant or tree is the linden. It will produce or secrete the nectar from which the honey bee can and does make honey for six weeks. By a judicious and careful selection of flowering linden trees, and by proper cultivating and planting of lindens we can have two months flow of the best matured for the bees to make into honey.

Mr. Pope. I heartily concur in what Bro. Russell says about the lindens, for I have taken some pains to verify the above facts.

On motion of Bro. Russell the present officers were continued for the year 1897.

It was ordered that the President and Secretary be a committee to see the members of the Legislature and have a bill passed to exempt bees from taxation.

Convention adjourned *sine die*.

E. S. POPE,
Secretary.

PURDUE UNIVERSITY.

NINTH ANNUAL REPORT

OF THE

Agricultural Experiment
Station.

LAFAYETTE, INDIANA.

1896.



EXPERIMENT STATION BUILDING.

BOARD OF CONTROL.

CHARLES B. STUART, President LaFayette, Tippecanoe County.
WILLIAM A. BANKS LaPorte, LaPorte County.
SYLVESTER JOHNSON Irvington, Marion County.
DAVID E. BEEM Spencer, Owen County.
JOB H. VAN NATTA LaFayette, Tippecanoe County.
BENJAMIN HARRISON Indianapolis, Marion County.
WILLIAM H. O'BRIEN Lawrenceburg, Dearborn County.
JAMES M. BARRETT Fort Wayne, Allen County.
JOHN MARTIN Brookville, Franklin County.

JAMES H. SMART, LL. D.,
President of the University.

EDWARD A. ELLSWORTH,
Secretary.

JAMES M. FOWLER,
Treasurer.

STATION STAFF.

CHARLES S. PLUMB, B. S. Director.
WILLIAM C. LATTA, M. S Agriculturist.
JAMES TROOP, M. S Horticulturist.
HENRY A. HUSTON, A. M., A. C Chemist.
JOSEPH C. ARTHUR, D. Sc Botanist.
ARVILL W. BITTING, D. V. M Veterinarian.
JESSE M. BARRETT, B. S., A. C. Assistant Chemist.
WILLIAM STEWART, M. S Assistant Botanist.
WILLIAM B. ANDERSON, B. S Assistant Agriculturist.

NINTH ANNUAL REPORT

OF THE

Purdue University Agricultural Experiment Station.

REPORT OF THE DIRECTOR.

To President James H. Smart:

SIR —I herewith take pleasure in transmitting to you the ninth annual report of the Purdue University Agricultural Experiment Station for the year 1896.

The Experimental Work of the year has been in the main along lines already well established. While this Station is supposed to have been established in 1887, with the acceptance by the State of the provisions of the General Government establishing the Stations through the Hatch act, experiment work really began with the earliest years of the University Agricultural Department. In September, 1878, ten acres were set apart for experiments with field crops, and this work was soon after established by Prof. C. L. Ingersoll, who, in 1879, assumed the Chair of Agriculture in the University. In 1876 the second annual report of the University contained reports of experiments by Dr. Wiley, Professor of Chemistry, and the annual reports were thereafter used as a medium for publishing agricultural investigations until 1883. In 1884, three years before the present station was organized, the publication of the bulletin was begun, which has continued without interruption up to the present time.

I have made the above statement to show that experimental work in behalf of agriculture at Purdue has been conducted for a much longer period of time than many might be aware of. In connection with the Agriculturist, certain field experiments have been continued now for fifteen successive years, a record that probably has not been made by any other station in America.

The growing season of 1896 was one of unusual moisture in this locality, so that plants in general grew and yielded entirely satisfactory crops. The rainfall for July and August was much greater than the normal, but this was not to the detriment of the crops on the station grounds.

Little new work has been planned by the Agriculturist, the old lines of work being continued much as before. A few field tests, however, were attempted. The greatly increased attention given to Kafir corn as a drouth-resisting plant, led to some comparisons of this with Indian corn at this station, but the wet season seemed to delay the ripening, so that a satisfactory comparison could not be made. In fact, the Kafir corn did not mature satisfactorily. A series of grass and forage crop plats was established early in the spring, and some attention will be devoted to these plants in the future.

In the Botanical Department new experiments of more than passing interest have been begun. What may, perhaps, be considered the most important of these is an experiment on roses grown in pots with a view of ascertaining the effectiveness of different forms of phosphates upon the plants. This work involved the use of two different varieties of 122 rose plants grown in pots in several distinct types of soil, subject to certain conditions of control of soil, moisture and fertility. The pots were kept on trucks and the vegetation house was used for shelter as occasion demanded. But very little work has been done along this line in this country, and as it is a field of much interest to florists and flower-growers, the work will be continued during 1897, the 1896 plants being in rest for this purpose.

Important experiments with lettuce have been in progress during the growing season in the greenhouse, involving questions of soil, moisture and fertility, and this work is still in continuation and promises results of interest and importance. One of the most important investigations of the year in the department has been the examination into the merits of formalin as a preventive of potato scab. This non-poisonous substance has, after one season's trial, given results that furnish a basis for the belief that it will do the work as well, if not better, than corrosive sublimate. As the latter is a deadly poison, if formalin can be used with economy and success in place of it, we may regard this discovery as an important one in the work of the department. The results of last season's work with this substance are now in manuscript in the writer's hands and ready for publication.

In the Chemical Department, in addition to the routine work, important investigations concerning soils and soil fertility have been begun and continued.

In the southern part of the State much interest is taken in soil fertility by the farmers, as in many localities in that region the benefits of manures in the soil are felt in no slight degree. Realizing that some field experimental work with plant food could be undertaken to advantage by the Station, arrangements were made to this effect in Orange and Monroe counties. This work involved a study of the fertilization of the types of clay soils, on which wheat and corn should be grown, and a further study of the soils themselves from both chemical and mechanical standpoint. This work was placed in charge of the Chemist, who selected the land for the experiment, and who has on several occasions superintended the necessary planting, fertilizing, and harvesting. This line of experimentation meets with the warm approval of many people interested in improving our soil fertility, and we trust that it may give returns that will largely benefit all concerned.

Another important line of soil study is associated with our experimental plats, as well as the soil in southern Indiana above referred to. With the establishment of the present experimental plats samples of soils were taken and set aside for

further examination and study. Since then other samples have been taken, including 1896, and during this year analytical work has been in progress, with a view of ascertaining the influence of the cultural and other conditions on the soil fertility and cropping during the past ten years. This work is still in progress, but results of interest are apparent.

The work with sugar beets has been continued, only in a limited way, but in view of the great importance of this subject the Station will continue its investigations to some extent in the future, that its services may be of use should the production of sugar from beets be undertaken in this State.

In the Horticultural Department but little has been attempted along new lines of research. Most of the work consists of a study of the varieties of fruits in the orchard and garden, with a limited amount of other work, as, for example, close root pruning of trees, use of insecticides and fungicides, a study of bud variation, etc.

The necessity of a greenhouse for this department becomes more and more manifest each year. The writer knows of no institution similar to this, where the horticultural interests are generally recognized, in which the Horticulturist is entirely unprovided with an opportunity for winter work. Until such facilities are provided him, this department may be considered as working at a far greater disadvantage than is desirable.

The work of the Veterinary Department has been conducted during the year in directions of vital importance to the stockmen of the State. The ravages of hog cholera, which have been excessive for the past two years, amounting to over three million dollars in 1895, have received special attention. Herds of diseased swine have been examined, experimental work has been attempted, both as a preventive and curative of the disease, and an extended study of the prevalence of the malady in the State has been made from 1882 to 1896. The work of the Station has attracted much attention in this direction, and the edition of a bulletin on hog cholera and swine plague, prepared by the Veterinarian, was soon exhausted after its appearance, owing to the unusual demand. A study of this disease will be continued during 1897 as a most important one of the department.

The subject of tuberculosis has also received much attention from the Veterinarian during the year, the tuberculin test having been tried on over 300 head of cattle. In view of the fact that tuberculosis in cattle and human consumption are identical, it is highly probable that in the future more and more interest will be taken by stockmen in eradicating this disease, which is more or less prevalent, from their herds. A bulletin on the subject, prepared by the Veterinarian, was published in December, which gave a comprehensive survey of this disease under the title of "Bovine Tuberculosis in Indiana."

A comparatively new and interesting field of research, that of the study of bacteria in the stable, as bearing on hygiene, was taken up by Dr. Bitting and Mr. Charles Davis, a senior agricultural student, and interesting results were secured. Material is available for publication on this subject.

No experimental work has been conducted in the dairy during the year, the conditions not being satisfactory for such work. During five months of the year, however, the dairy is used for instructional purposes.

Several feeding experiments with calves, sheep and swine have been carried on during the year for longer or shorter intervals. In the winter a comparison of the feeding value of shredded corn fodder and clover hay was made on a bunch of twelve lamb wethers. In the summer another experiment was conducted, not with the most satisfactory results, comparing rape and blue grass as pasture, both for sheep and for lambs. Dogs, unfortunately, got among these sheep and injured enough of them to abruptly terminate the experiment.

Calf feeding experiments have been continued, as during the past few years, bearing on the value of different foods in producing flesh. A feeding experiment with young growing pigs was conducted to compare the feeding value of hominy feed, shorts and skim milk with cornmeal, shorts and skim milk. Four female pigs were used in this experiment, which extended from the middle of October till December. Another experiment with pigs, related to the influence of a grain ration of shorts and cornmeal on a suckling sow and pigs, compared with a ration of shorts, cornmeal and skim milk.

During the year some experimental feeding of chickens was conducted, one lot of fowls being fed to study the influence of carbonaceous and nitrogenous foods on flesh production, and the other a study of the feeding value of skim milk with young growing chickens.

In addition to the investigations heretofore mentioned, as conducted in the several departments, other lines of research have been in progress which have been referred to in previous reports, that do not need mention at this time. Fuller information concerning the work of the Station is given in the reports of the different departments, in this volume.

The Station Staff has remained unchanged in every respect during the past year, excepting in the appointment of Mr. W. B. Anderson, B. S., a graduate of the University School of Agriculture, to the position of Assistant Agriculturist, in June.

Improvements of the most important character have been made in the Station building during the year. The chemical laboratory has been removed from the suite of rooms occupied upstairs on the east side of the building, and provided with far better accommodations on the first floor immediately below, and in the old L, before this used as a store room, but which was remodeled and fitted into a general laboratory, small store room and polariscope room. This change made it necessary to provide new accommodations for the Veterinary Department, which were found in the old quarters of the Chemical Department above, which were repainted and otherwise improved and repaired. The two rooms occupied by the Horticulturist were vacated by him for rooms on the second floor over the Director's offices. Of these two vacated rooms one was added to the Chemical Department and the other to the Botanical Department, to be used for a class room. The hall extending from the center of the building to the east has been closed up, and is now used as a store room and closet for the Botanical Department. These changes that have been made, have resulted in providing the Chemical and Veterinary departments with unusually complete accommodations for laboratory work, and especially the former. More detailed descriptions of the laboratories and the equipments of the Chemist, Veterinarian and Botanist are to be found in

their reports further on. A reference to the floor plans, also included in this report, will greatly assist the reader in comprehending the scope of the Station laboratories.

Additional to the above improvements, which, by the way, it is very appropriate to state, were made at the expense of the University, and not the Station, may be mentioned the painting and general improvement of the library room, which has greatly added to its appearance.

On the farm but little has been accomplished in new improvements. The entire east side of the Station grounds was refenced in the spring with post and smooth wire, some eighty rods in all. About forty rods of neat post and board fencing was also built, facing State street and just west of the Station building and north of the experimental plats. These improvements were very necessary as a proper protection of our experimental plats, and have added greatly to the appearance of the establishment. Some more fencing on the north and west end of the farm needs attention, as well as on the east and west side of the pasture, but, as a rule, nearly all the fencing surrounding the Station property, is in excellent shape.

Important improvements are, however, most desirable at the farm. The buildings need repainting very much indeed. The tool building should be enlarged to provide suitable accommodations for our excellent and constantly growing collection of implements. We have no pig house worthy of the name, although it is very desirable that the Station should give a proper amount of attention to swine feeding, an industry of great magnitude in Indiana. To do this work properly, suitable housing accommodations should be available on the farm for our swine. The same may also be said relative to a sheep building, the present one being small and not creditable to the State. An appropriation of \$1,500 for swine and sheep buildings could be used to great profit. The old silo in the cattle barn is in such poor condition that a new one should be built in time for filling it with the crop of 1897. The old one will not do, and a new one is a necessity from the standpoint of economy.

The *publications* of the Station for this year have been as follows :

PAMPHLET BULLETINS.

No. 58, Vol. VII, February, 1896, pp. 10. Hog cholera and swine plague in Indiana. By A. W. Bitting.

No. 59, Vol. VII, March, 1896, pp. 11-40, plates VIII. Bacteriosis of carnations. By J. C. Arthur and H. L. Bolley.

No. 60, Vol. VII, April, 1896, pp. 41-54, plates IX-XIV, figures 25-31. The American persimmon. By James Troop and O. M. Hadley. Composition of the persimmon. By H. A. Huston and J. M. Barrett.

No. 61, Vol. VII, August, 1896, pp. 55-70. Field experiments with wheat. By W. C. Latta and W. B. Anderson.

No. 62, Vol. VII, October, 1896, pp. 71-96, figures 32-42. The udder of the cow. By C. S. Plumb.

No. 63, Vol. VII, December, 1896, pp. 97-116, plates XV-XVI. Bovine tuberculosis in Indiana. By A. W. Bitting.

In addition to the above there was published the
Eighth Annual Report of the Agricultural Experiment Station, 1895, pp. 44,
And the following twenty-four

NEWSPAPER BULLETINS.

No. 18. January 4, 1896. On the winter protection of live stock. By C. S. Plumb, Director.

No. 19. January 21, 1896. Use of commercial fertilizers in Indiana. By H. A. Huston, Chemist.

No. 20. February 7, 1896. Kafir corn in Indiana. By W. C. Latta, Agriculturist.

No. 21. February 28, 1896. Alfalfa without irrigation. By W. C. Latta, Agriculturist.

No. 22. March 25, 1896. Oats and field peas for green fodder. By C. S. Plumb, Director.

No. 23. April 8, 1896. Spraying with insecticides and fungicides. By James Troop, Horticulturist.

No. 24. April 15, 1896. Prevention of potato scab. By J. C. Arthur, Botanist.

No. 25. April 27, 1896. Artichokes as stock food. By C. S. Plumb, Director.

No. 26. May 12, 1896. Two important currant insects. By James Troop, Horticulturist.

No. 27. May 15, 1896. Preventing chinch bug ravages. By James Troop, Horticulturist.

No. 28. June 5, 1896. Destroying the Russian Thistle. By J. C. Arthur, Botanist.

No. 29. June 25, 1896. The use of the hand or baby separator on the farm. By C. S. Plumb, Director.

No. 30. July 8, 1896. Killing the horn fly. By C. S. Plumb, Director.

No. 31. July 16, 1896. Crimson clover in Indiana. By W. C. Latta, Agriculturist.

No. 32. August 15, 1896. Stomach worms in sheep. By A. W. Bitting, Veterinarian.

No. 33. August 28, 1896. Winter oats in Indiana. By W. C. Latta, Agriculturist.

No. 34. September 19, 1896. Notes from the Experiment Station. By C. S. Plumb, Director.

No. 35. September 30, 1896. Shredding corn fodder. By C. S. Plumb, Director.

No. 36. October 10, 1896. Hog cholera. Suggestions to swine growers. By A. W. Bitting, Veterinarian.

No. 37. October 28, 1896. Keeping fall and winter apples. By James Troop, Horticulturist.

No. 38. November 20, 1896. The setting of milk. By C. S. Plumb, Director.

No. 39. December 5, 1896. Feeding hogs for quality of meat. By C. S. Plumb, Director.

No. 40. December 19, 1896. The sugar beet question in Indiana. By H. A. Huston, Chemist.

No. 41. December 30, 1896. Hints on window gardening. By William Stuart, Assistant Botanist.

There was also published a poster bulletin on the Russian thistle that was distributed to those counties in the State in which this pest has been discovered.

Mailing List. The above periodicals are very widely scattered. The pamphlet bulletin is distributed as a rule to the entire mailing list, which now numbers 13,297 names. This list, however, is growing so rapidly that 14,500 copies of Bulletin 63 were printed in order to provide a surplus for future use. The newspaper bulletins are one page sheets of about 450 words, and editions of 700 of these are printed, of which some 600 go to Indiana periodicals, and about 50 outside the State.

The following table shows the size of the mailing list at the beginning of each year since 1893:

STATION MAILING LIST.

NUMBER OF NAMES ON LIST OF	Jan. 18, 1893.	Jan. 4, 1894.	Jan. 10, 1895.	Jan. 1, 1896.	Jan. 1, 1897.
People in Indiana	5,741	7,131	8,666	9,143	10,590
Indiana periodicals	635	668	653	625	660
People in other States	1,158	1,316	1,608	1,788	1,872
Periodicals in other States	83	91	86	92	76
Foreigners	28	51	61	77	91
Foreign periodicals	7	7	7	6	8
Total	7,650	9,264	11,079	11,731	13,297

During this year a beginning has been made in revising this list, and notices will, from time to time, be attached to the generally circulated bulletins, requesting an acknowledgment of its receipt, with an expression if wished in future. From these acknowledgments a new list will be made, which will eventually be the only one in service at the Station.

The *income* of the Station, as may be seen by the Treasurer's report, consists of \$15,000 per year from the United States Government, and the proceeds of the farm's sales, which range from \$1,000 to \$2,000. This sum is not large enough to meet the serious demands of the Station, which has steadily grown during the past ten years, while its income has really remained at a standstill. The improvements, referred to elsewhere as necessary, are important ones, and can not be accomplished from our present income. Assistance, in my opinion, should be rendered by the State. Even if the State would appropriate only sufficient funds

for printing our various publications, this would place over \$1,000 more a year as available for other purposes. The most important things in the life of the Station are its investigations, and the next thing of importance is the disseminations of the information obtained through them. If the United States Government provides the money for doing the work, the State, at least, can afford to pay for the publication of the results of it.

The following figures show the revenue for some of the Agricultural Experiment Stations of the country for the year 1893, the most recent ones available to the writer:

New York State	\$68,500
California	33,810
Wisconsin	29,980
Massachusetts (Hatch and State)	29,104
Ohio	28,936
Louisiana	26,600
New Jersey (State and College)	26,000
Alabama	24,878
Pennsylvania	24,874
North Carolina	23,400
Georgia	22,000
Connecticut (State)	21,671
Indiana	16,582

All of these stations received aid from the State excepting Indiana, and through this State assistance they have been able to materially add to the value of their services of the State. I trust that the State of Indiana will see fit in the near future to show its appreciation of the work of this Experiment Station by making such an increase to our income as will enable us to add to our laboratory facilities and accomplish a greater amount of work than is at present possible.

I herewith submit the annual reports of the several departments of the Station as a part of this, the Annual Report of the Experiment Station for 1896. I also add as an appendix a list of gifts presented the Station during the year, including periodicals.

Respectfully submitted,

C. S. PLUMB,
Director.

REPORT OF THE AGRICULTURAL DEPARTMENT.

To C. S. Plumb, Director :

SIR—The work of the department for the year 1896 has been, in the main, a continuation of lines of investigation previously planned.

A new experiment was undertaken last spring to ascertain the relative merits of Kafir and common corn as field crops.

Some new experiments with wheat have been planned, and a number of grasses were sown in the spring of 1896, both singly and in mixtures. Some twenty-five or more packages of grass and forage plant seeds were received last spring from the United States Department of Agriculture at Washington, D. C., and sown in small sample beds.

The growing season of 1896 was very favorable at the Station for all spring crops and for pastures and meadows. The season was also fairly favorable to wheat. The yields of oats at the Station were better in 1896 than in any previous year since the establishment of the Station.

I. EXPERIMENTS WITH VARIETIES.

1. *Wheat*. Number of varieties grown in 1896, 8; time under trial, 1 to 13 years; average yields, range from 17 to 29 bushels; yields in 1896, range from 13 to 30 bushels; more promising varieties, Michigan Amber, Willett's, Velvet chaff.

2. *Oats*. Number of varieties grown in 1896, 27; time under trial, 1 to 8 years; average yields, range from 34 to 62 bushels; yields in 1896, range from 51 to 84 bushels; more promising varieties, Black, American Banner, White Russian, Black Prolific.

3. *Grasses and Clovers* sown in the spring of 1896 were *Bromus inermis* (Awnless brome grass), *Bromus pratensis* (meadow brome grass), *Festuca elatior* (taller fescue), *Avena elatior* (tall oat grass), timothy, red top, orchard grass, alsike, common red and mammoth clovers.

The clovers all started well and made a good stand; the timothy made a fair stand. The red top did fairly well and the orchard grass very well. The other grasses did not succeed well, although the conditions appeared to be very favorable. Doubtless the seeds were lacking in vitality. A mixture of grasses, consisting of orchard grass, tall oat grass, meadow fescue and common clover, was sown on one plat. At the end of the season the orchard grass and common clover quite fully occupied the ground. The other grasses in the mixture made very little showing.

On another plat a mixture of timothy, red top, taller fescue and mammoth clover was sown. The taller fescue failed to do much. The timothy, red top and mammoth clover all did well. These grass plats were clipped with the mower several times to check the growth of weeds. Of the grasses and forage plants sown on the sample beds the following failed to grow, namely: *Iris pabularis*, *Eragrostis neo Mexicana*, *Tripolium Alexandrinum*, *Arundinaria macrosperma*. Alfalfa and alsike, red top and mammoth clovers all made a good growth.

Festuca elatior made a thick growth three or four inches high, but formed no heads. It would prove to be a good pasture grass where it grows well. *Bromus pratensis* made a dense growth, the leaves being eight inches long; no heads were formed. This would doubtless prove an excellent pasture grass. *Bromus inermis* also made a good growth, though hardly equal to *pratensis* in stand. About one-third of the seed failed to grow. *Festuca pratensis* made a soft growth of plants five to six inches high, completely covering the ground. It will doubtless prove a valuable pasture grass. *Dactylis glomerata* (orchard grass) made a thick, heavy growth eight or nine inches high, but formed no seed stalks. It is one of the best pasture grasses. *Phleum pratense* (timothy) made a growth eight to twelve inches high, and formed many small heads; the stand was very good. *Agrostis vulgaris* (red top) made a thick growth about five inches high, but formed no heads. *Avena elatior* (tall oat grass) made a dense growth about ten inches high; would doubtless prove a good pasture grass. *Panicum Texanum* (Texas panic grass) made a growth four feet high. It is a very coarse grass, developing woody stems when the plant ripens. Horses, cattle and sheep ate it readily when samples of it were used before maturing. *Lespedeza striata* (bush clover) made a growth about four inches high, forming a thick mat over the ground; it does not appear to possess value for this section. *Eragrostis Abyssinica* made a good stand and a rapid growth. It would probably make an excellent pasture grass. Horses, cattle and sheep ate it readily when cured as hay. *Medicago maculata* (spotted medick) made a good stand, but the growth was only two or three inches high. It appears to have little economical value for this section. *Desmodium tortuosum* (tick trefoil) made a coarse growth, with rounded leaves and woody stems. No stock would eat it, either green or as hay. *Saccaline* (knot weed) made a poor stand. The growth was from twelve to fourteen inches high. Stock cared very little for it. *Cytisus proliferous alba* made a poor stand. The growth was only about four inches high. It has practically very little value. Persian clover made a growth about six inches high. The stand however, was poor. It appears to have little value, either as hay or for pasture.

4. *Lathyrus sylvestris*. This is a species of legume, but is an exceedingly slow grower at this Station. It was sown in the spring of 1894. The crop the first year was not over four or five inches high, the second year about six or eight inches. In 1896 the growth was perhaps twelve or fifteen inches high. Stock refused to eat it, unless put on short allowance, in either the green or cured form. It has no value whatever as a crop in rotation. It might prove of value on light, sandy soils, in case it could be allowed to grow for a number of years. It strikes root deep in the soil, and would, in six or eight years, doubtless effect a considerable improvement in light, worn-out soils.

II. THICK AND THIN SOWING OF WHEAT.

Quantity of seed sown, two to eight pecks per acre; time under trial, 12 years; range of average yields, 23 to 30 bushels; range of yields in 1896, 9 to 31 bushels; highest average yields produced from seven pecks to the acre; lowest average yield from two pecks to the acre.

Velvet chaff wheat has been used chiefly in this experiment. In 1896 both Velvet chaff and Rudy wheats were used.

III. EARLY AND LATE SOWING OF WHEAT.

Range of dates previous to the fall of 1893, September 18 to October 18; range of dates since the fall of 1893, September 13 to October 9; time under trial 8 years; range of average yields, 21 to 34 bushels; range of yields in 1896, 7 to 27 bushels; highest average yield from sowing, September 18 to 20.

IV. DEEP AND SHALLOW CULTURE OF CORN.

Time under trial, 8 years; range in depth of culture, 1 to 4 inches; average yields per acre as follows:

From cultivation 1 inch deep	44 bushels
From cultivation 2 inches deep	43 bushels
From cultivation 3 inches deep	41 bushels
From cultivation 4 inches deep (last three years only)	29 bushels

Yields in 1896:

Culture 1 inch deep	52 bushels
Culture 2 inches deep	51 bushels
Culture 3 inches deep	53 bushels
Culture 4 inches deep	47 bushels

The low average yields in the first total are due to droughts in 1893, 1894 and 1895.

V. EXPERIMENTS WITH CORN CULTIVATORS.

- The following named implements have been under trial in this experiment:
1. The Albion spring-tooth wheel cultivator, with six teeth in each gang.
 2. The Tower's surface cultivator, whose reversible, flat blades shave the soil, but stir it only to a very slight depth.
 3. The Hoosier cultivator, which has flat blades, whose action is much the same as that of Tower's cultivator.
 4. The Corn plow, consisting of two shovels in each gang. Bull tongues have been used instead of the inside shovel for the first and second cultivation, as a rule.
 5. The Planet Junior one-horse cultivator, with leveling attachment.
 6. Breed's weeder, a shallow-working tool with numerous curved spring teeth. This implement has been used for the first two cultivations, and then succeeded by the one-horse harrow.

The results obtained by these cultivators are shown in the following table :

NAME OF CULTIVATOR.	TIME UNDER TRIAL.	YIELD PER ACRE.
Albion spring-tooth.	8 years	57 bushels.
The Corn plow	8 years	55 bushels.
The Hoosier	7 years	55 bushels.
Tower's	4 years	56 bushels.
Planet Junior	5 years	53 bushels.
Breed's weeder and harrow.	3 years	53 bushels.

The above showing is unfair to the implements which have been under trial a short time, owing to the droughts of 1893, 1894 and 1895.

The yields obtained in 1896 from these implements are as follows :

Albion spring-tooth cultivator	82.48 bushels
Corn plow	85.50 bushels
The Hoosier cultivator.	88.40 bushels
Tower's cultivator	87.86 bushels
Planet Junior cultivator	82.78 bushels
Breed's weeder and harrow	82.14 bushels

VI. EFFECTS OF PREVIOUS MANURING ON YIELD OF CORN.

The ground devoted to this experiment has grown corn continuously since 1880. In 1883 and 1884 fresh horse manure was applied to alternate plats, amounting for the two years to about fifty tons per acre. No manure has been used in this series of plats before or since the two years named. The manured plats show an average increased yield per acre of more than ten bushels. The aggregate increase from the manure in thirteen crops has been 132 bushels to the acre. The increase in 1896 was three bushels to the acre, showing that the manure has not yet been exhausted.

The crop of 1887 was an almost total failure, owing to the severe drought that year, and it is not therefore included in the figures given above.

VII. THE EFFECT OF ROTATIVE CROPPING AND CONTINUOUS GRAIN GROWING ON YIELD.

Corn, wheat and oats have been grown *continuously or in alternation*, one with another, on one series of plats for fifteen years. The same crops have been grown in *rotation with grass and clover* on an adjacent series of plats for a like period. The grain, hay, stalks and straw have been regularly removed from both series of plats, and no manure or fertilizer has been used on either series since the experiment began.

The average yields per acre on the two series are as follows :

NAME OF CROP.	ALL-GRAIN SERIES.	ROTATIVE SERIES.	GAIN FROM ROTATION.
Corn	27 bushels	33 bushels	6 bushels.
Oats	27 bushels	34 bushels	7 bushels.
Wheat	14 bushels	20 bushels	6 bushels.

The gains from rotation, expressed in per cents. are : Corn, 22 per cent.; oats, 26 per cent.; wheat, 44 per cent. Both series were plowed and put into corn in the spring of 1896. The following yields per acre were obtained :

All-grain series	48.42 bushels.
Rotative series	54 08 bushels.
Gain from rotation	5.66 bushels.
Per cent. gain	11.7 bushels.

- Two important results were gained from this experiment:
1. Larger crops can be secured by a judicious system of cropping.
 2. The fertility of the soil is better conserved by such a system of cropping.

VIII. HEAVY AND LIGHT APPLICATIONS OF MANURE AND FERTILIZER.

This experiment was begun in 1889, and has been carried on continuously since. The plan of the experiment includes a variety of crops to be grown in shorter or longer rotations, and also the continuous growing of wheat and corn on the several series of plats. Certain plats in each of the several series received heavy and light applications of fertilizers or manure.

Frequently recurring and severe droughts have thus far greatly interfered with this series of experiments. In some cases the drouth has been so intense as to prevent the manure or fertilizer from having any beneficial effect upon the yield.

The *lighter* applications of manure have generally proved profitable. *Heavy* manuring has proved very unprofitable (in a few instances), or less profitable than *light* manuring. The lighter applications of fertilizers have in some instances proved profitable, while the heavy applications, though sometimes producing a marked effect on yield, have generally proved unprofitable.

In explanation of the above it should be stated that the soil of the Station farm is still sufficiently fertile to produce, in favorable seasons, about twenty bushels of wheat or forty bushels of corn without fertilization.

IX. COMPARATIVE YIELD OF COMMON AND KAFIR CORN.

The experiment was undertaken in the spring of 1896 to determine the relative yield of stalk and grain of common corn as compared with the red and white varieties of Kafir corn. The plats which were devoted to this experiment lay side by side, and were of the same form and size, about one-tenth acre each. The accompanying table gives the yield in pounds of stalks and in bushels of grain fifty-six pounds each.

The yields of the two varieties of Kafir corn were determined from sample heads, and are therefore only approximately accurate.

YIELDS PER ACRE OF CORN AND KAFIR CORN.

VARIETY.	STALKS.	GRAIN.	TOTAL CROP.
Purdue yellow corn . .	5,972 pounds	79.60 bushels	11,544 pounds.
Red Kafir corn	10,706 pounds	18.87 bushels	11,763 pounds.
White Kafir corn	11,205 pounds	25.51 bushels	12,634 pounds.

It appears that the white Kafir corn gave a considerably heavier yield of total crop, but that the yield of the grain of both varieties was much less than that of corn. This is in part due to the fact that a rather early frost prevented the full maturing of the Kafir corn.

X. COMPARATIVE TEST OF VARIETIES OF CORN.

This experiment has been conducted three years. Its purpose is to determine the adaptation of a few leading varieties of corn to the different sections of the State and also to note the effect of climate and soil on the height of stalk, yield etc. The following table shows the average results obtained, for the three years of the test, in the several counties in which the experiment was tried:

Table Giving Results of Co-operative Test of Varieties of Corn.

VARIETY.	ELKHART COUNTY.				GRANT COUNTY.				BARTHOLOMEW COUNTY.				POSEY COUNTY.				Average Yield, Bushels.
	No. Years Grown.	Bushels Per Acre.	Height, Inches.		No. Years Grown.	Bushels Per Acre.	Height, Inches.		No. Years Grown.	Bushels Per Acre.	No. Years Grown.	Bushels Per Acre.	Height, Inches.				
			Base of Ear.	Tip of Stalk.			Base of Ear.	Tip of Stalk.					Base of Ear.	Tip of Stalk.			
Orange Judd	*2	68.01	45	99	*2	34.90	38	86	+1	50.02	43	103	+1	50.34	39	93	51.45
Dekalb County Yellow. .	3	66.92	38	91	*2	31.64	44	86	3	67.86	59	121	3	73.97	53	116	52.81
100 Day Yellow.	*2	66.87	40	90	*2	39.58	46	92	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	53.18
Hartman's White	3	67.83	42	96	*2	45.71	54	110	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	58.98
Early Yellow.	3	64.05	38	86	*2	37.29	44	88	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	53.35
Riley's Favorite	3	61.07	42	95	*2	39.90	42	86	+1	50.02	43	103	+1	50.34	39	93	51.91
Wayne County White . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	67.86	59	121	3	73.97	53	116	70.92
Smith's Improved . . . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	*2	63.91	50	119	*2	64.12	50	105	63.56
Success White . . . . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	61.23	62	120	3	78.80	52	117	70.02
Fleming's Yellow . . . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	*2	67.63	46	121	*2	78.51	44	97	73.07
Boone County White . . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	67.58	52	116	3	71.83	45	107	69.87
White Prolific . . . . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	70.83	56	125	3	81.12	48	113	75.99
Braxton's Best . . . . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	+1	64.03	53	115	. . .	. . .	. . .	. . .	64.03

* Grown in this county in 1894 and 1895.
† Grown in this county in 1896 only.

The table shows some interesting variations in yield as well as in height of ear and of entire stalk. The almost universal opinion of those who aided the Station in making the test is to the effect that home grown varieties are more satisfactory than those from other localities.

Most of the field and tabular work, connected with the experiments of this department, was performed by the Assistant Agriculturist, Mr. W. B. Anderson, who discharged his duties in a very careful and efficient manner.

Respectfully submitted,

W. C. LATTA,
Agriculturist.

REPORT OF THE BOTANICAL DEPARTMENT.

To C. S. Plumb, Director :

SIR—The work in this department for the year 1896 has been, on the whole, as successful as heretofore, while some of the experiments have given results that are more than usually gratifying, both on account of their scientific bearing and their distinctly practical character. Much of the work has necessarily been upon subjects carried over from the preceding year, in accordance with the method of work explained in the last report, but some new and rather striking experiments have also been inaugurated that have led to excellent results. Of these the most prominent is the introduction of a new fungicide, known in the market as formalin, which proves to be a satisfactory substitute for corrosive sublimate in the prevention of potato scab, while possessing the great advantage of lacking poisonous properties. A perfectly safe as well as efficient preventive for this important crop disease has been greatly needed, and its discovery is likely to meet with an appreciative reception.

Besides the several lines of experimental work carried on during the year, and which will presently be mentioned more specifically, the interior of the greenhouse has been somewhat remodeled and the laboratories renovated. It is, therefore, thought to be an appropriate time to publish a brief description of the appliances and facilities for botanical work possessed by the Station. This seems the more desirable as many inquiries have shown a desire on the part of the public to have a better acquaintance with the institution in its several departments and classes of work. A brief account of the botanical department was given in the first annual report for 1888, but since then there have been additions and changes, and a steady growth that makes the department of to-day a far more efficient means of serving the public than the report of eight years ago would indicate. Therefore, after giving an outline of the work for the last year, the present condition of the various appliances for carrying on the work will be described.

PRINCIPAL INVESTIGATIONS OF THE YEAR 1896.

It is impossible to give in this place more than a brief mention of the principal topics on which work has been done. There are many things which consume time, sometimes quite out of proportion to the intrinsic value of the information secured or results obtained, which call for no statement; such are the naming of specimens of plants, usually of weeds, advice upon all kinds of subjects, tests of seeds and alleged important new vegetables and flowers, trials of various plant foods and remedies for diseases, etc. These matters are usually answered by letter, sometimes when of sufficient general importance, through the press. Investigation is, however, considered the chief work of the department and the only part calling for specific mention.

Potatoes. The recent rapid prominence attained by formalin (also called formaldehyde) as a germicide, as well as for other practical purposes, naturally suggested its use in the prevention of plant diseases. The initial trial made in the greenhouse during the winter of 1895-6, looking toward its use in the prevention of potato scab, showed that tubers soaked for some hours in a solution of various strengths up to one part in 500 of water were apparently unaffected in their growth by the treatment for either better or worse, so far as could be told from the subsequent appearance. Further test in the greenhouse indicated that while innocuous to the potato plant, it had germicidal action on the scab germ, and largely or quite prevented scab in the crop of tubers raised from such treated seed. These preliminary trials were, indeed, of the most promising character.

Upon the opening of spring, field trials of the new fungicide were inaugurated, based upon the data obtained in the greenhouse trials. Not only were a series of experiments made at the Station, but the following persons consented to make independent tests of the new substance and to report to the Station. They were Mr. T. B. Terry, of Hudson, Ohio; Mr. Arthur Hoadley, of Ockley, Ind.; Mr. William M. Reser, of Lafayette, Ind., and Mr. J. H. Skinner, of Romney, Ind. In all the trials of the season the results were of the most favorable sort, and appear to fully warrant the belief that in formalin the farmer has a valuable, cheap, non-poisonous and satisfactory means of practically preventing potato scab. The full report of this series of experiments has been written up and is now ready to appear in the form of a bulletin.

Roses. An experiment upon the effectiveness of different forms of phosphates upon roses was carried out in the vegetation house with excellent results. The work was especially under the charge of Mr. William Stuart, the Assistant Botanist. The roses were selected to be as nearly as possible of uniform size and vigor. They were grown in zinc cans with good bottom drainage, one plant in a can, using two kinds of soil, a clay loam and a light garden loam. The test included eighty plants of *Kaiserin Augusta Victoria* and forty-two of *Perle des Jardin*. The forms of phosphates used were raw bone meal, dissolved bone black, Pamunkey phosphate and superphosphate, the first named giving the best results. The results were determined by the number and quality of the flowers and length and number of the internodes. The full report, which is to be put in the form of a bulletin, will contain many interesting details that can not be mentioned here.

Corn. The study of the occurrence of corn smut and its prevention by spraying was continued during the season in much the same manner as reported for 1895, and with similar results. The unusual amount of rain in July interfered with the effectiveness of the spraying, and a heavy wind storm on July 19, which broke down much of the corn of the experimental plats, especially contributed toward making the test incomplete. The results so far attained have, however, seemed of sufficient value to warrant their publication in bulletin form, and are now being arranged for the purpose.

Carnations. The work which has been carried on since 1888 in the investigation of the bacteriosis of carnations, a wide spread and important disease of carnations, first detected and made known by this department, was embodied in a bulletin (No. 59) of twenty-five pages and eight partly colored plates, issued in March.

The bulletin, which gives practical directions for preventing the disease, has been warmly received by carnation specialists and florists in general. The recommendations which have grown out of this work have been widely adopted, and have brought about an entire change in the methods of watering and other details of treatment of the carnation under glass. A noteworthy feature of the bulletin is the use of two colored plates—the first so far issued by the Station—which illustrates a part of a diseased plant and three culture tubes of the germ, done in the most creditable style of chromolithography.

A peculiar abnormal condition of the flower buds of the carnation was examined in the early part of the year, and a paper on the same presented before the American Carnation Society at its annual meeting in New York. The petals of the flower become adherent in the bud, and are unable to separate at time for opening. The cause was not ascertained.

Lettuce. During the winter of 1895-6 two crops of lettuce were grown in the greenhouse for the purpose of studying the best ways of feeding, watering and handling this important winter crop. Excellent data were secured. The work is being repeated, however, with some modifications during the present winter (1896-7), and when the records are arranged, the whole subject will be given to the public in the form of a bulletin.

Cinerarias. An examination into the merits of the cineraria as a flowering and decorative plant has been begun. Seeds were sown in June and at subsequent periods, and the first flowers appeared in December. Seeds have been obtained from most of the large dealers in this country and from some of the most prominent ones in Europe. About seventy packets of seeds are being tested, which include most of the best varieties known. It is yet too early to speak of the value of this work.

Weeds. Considerable attention was given to the occurrence and spread of weeds in the State. The intention is to gather data as it comes to hand, and to publish information from time to time. A newspaper bulletin giving directions for destroying the Russian thistle was issued in June.

Other Topics. The trial of sub-irrigation for the garden was repeated this season with only indifferent results. Three newspaper bulletins were issued during the year. Beside the one on weeds, already mentioned, one was devoted to window gardening, written by the Assistant Botanist, and the third to the use of corrosive sublimate for the prevention of potato scab.

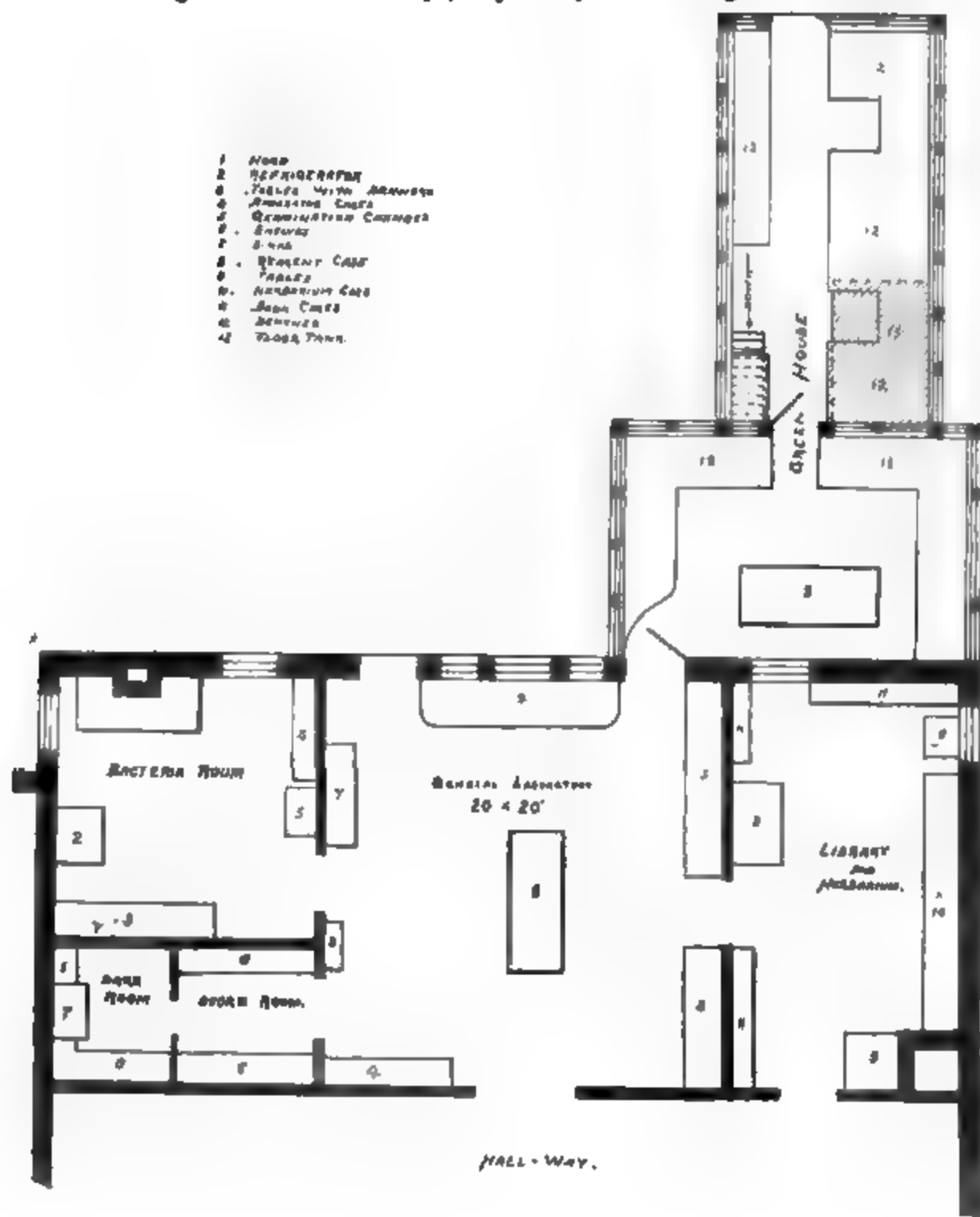
EQUIPMENT OF THE DEPARTMENT.

The department has assigned to it and uses for its work two laboratory rooms with small store room and photographic dark room, a room for library and office, two greenhouse rooms, a vegetation house and from a half acre to two acres of ground, as may be required in different years.

The Main Laboratory is twenty feet square, amply lighted and provided with more than the customary fittings for convenient use of water and gas. The available wall space is occupied with cases and desks, quite well supplied with the

necessary kinds of glass and porcelain ware, reagents and stains, supplies for the microscope and other special aids to research.

A board shelf under the triple south window makes the best kind of work-table for using with a microscope, especially as the light is modified with



FLOOR PLAN OF BOTANICAL LABORATORY. Fig. 1.

white Holland shades. A Zeiss microscope, with a number of lenses made by Zeiss, Spencer and Bausch & Lomb, an Abbe camera lucida, a temperature chamber for the microscopic and a microphotographic attachment, permit the carrying

out of investigations of almost all kinds in which the microscope is a prime requisite. The laboratory also possesses a Verbeek & Peckholdt analytical balance, Springer torsion balance for fine weighings, and other balances for coarse work. An instantaneous water heater above the sink is one of the special conveniences of this room.

The Bacteriological Laboratory possesses a large hood to carry off vapors and gases, a vegetation chamber for the cultivation of germs at constant temperature, steam and dry sterilizers and other appliances for working upon bacterial and other germ diseases.

The Photographic Dark Room is fitted up with shelving and sink, and supplied with water and gas. The department possesses a camera provided with a 5 by 8 wide angle lens, made by Bausch & Lomb, and limited appliances for developing and printing photographs.

The Office and Library is a room 12 by 20 feet, with wall cases for books, an herbarium case and an office desk. The last is used by the Botanist, while a desk for the Assistant Botanist is placed in the main laboratory.

The botanical library of the Station contains about 200 bound volumes and a few pamphlets. About three-fourths of these are serial publications, and the remainder chiefly works on fungi, bacteria and plant diseases. They are distributed as follows:

Zeits, für wiss. Mikroskopie, 1884-88	5 vols.
Zeits, für Pflanzenkrankheiten, 1891-96	6 vols.
Hedwigia, 1852-84	23 vols.
Berichte der Deutschen Bot. Gesellschaft, 1833-96	14 vols.
Botanische Zeitung, 1886, 1888, 1890-96	9 vols.
Botanisches Centralblatt, 1888-96	86 vols.
Just's Bot. Jahresbericht, 1873-81, 1886-88	12 vols.
Centr. für Bakt. und Parasit, 1887-96	20 vols.
Miscellaneous serial and other works	75 vols.
<hr/>	
Total	200 vols.

The station herbarium can scarcely be said to have been begun. The only mounted specimens are the two centuries of Halsted's "American Weeds," and five centuries of Linhart's "Fungi Hungarici." The number of unmounted specimens is insignificant. The demands upon the department for the identification of weeds and other flowering plants and of parasitic fungi causing diseases, could not have been satisfactorily met had it not been for the availability of the large collection of the flowering plants and fungi owned by the Botanist.

The instruction of students in the regular University courses is part of the duty of the Botanist during the months of January, February, March, April and May, and the laboratory work arranged for such students is carried on in the rooms of the Station. The number of students—Junior, Senior and Post-graduate—has varied for the different years from four to fifteen, and the laboratory is occupied by them from six to ten hours each week. For this work the University has provided a fair amount of apparatus, which supplements that owned by the Station.

After the present year another laboratory room, containing about 300 feet of floor space, will be connected with the general laboratory and fitted up for the exclusive purpose of instruction. The association of the two classes of work has had reciprocal advantages, especially in providing a larger supply of apparatus than either the Station or the University could have readily furnished independently.



EXPERIMENT STATION GREENHOUSE. Fig. 2.

The greenhouses consist of a lean-to, on the same level and directly connected with the general laboratory, having a floor space of 12 by 18 feet, and facing the south. Beyond this room is another, a little larger, running at right angles, with a short span to the east. The rooms are heated with steam from the boiler which supplies the laboratories and offices of the Station building, and through pipe radiators of the usual pattern, placed against the walls. There are two radiators in each room which may be used independently; and to further control the amount of heat, four of the six pipes of each radiator are supplied with manifold valves, so that each can be shut off, or turned on, independently of the others. An electrical apparatus for the automatic control of the steam is also in place, and is used at times. The two rooms are kept at the same, or at different temperatures, as required for the experiments at hand.

The houses are fitted with side benches, and in the lean-to portion a tier of shelves has recently been put in, rising against the brick wall forming the north side, which gives a large amount of available space, and brings the plants nearer to the light. In the other room the principal bench is $3\frac{1}{2}$ feet wide by 19 feet long and for three years was fitted with a system of subirrigation, made of three inch tiling, having the joints covered with mortar. The water was run into it at one end and escaped through the walls of the tiling and through cracks, an opening at

the farther end permitting an overflow, if too much water were introduced. This worked fairly well, but for purposes of experiment was too uneven in distribution of the water and in the space occupied by the tiling.

The subirrigation system now in use, put in place in September, gives perfect satisfaction. The bench has a water tight zinc lining over the bottom, and extending three inches up the sides. In this pan are laid common soft building brick, placed close together on edge. The soil is added and treated in the usual manner.* Water is introduced through small pipes in the front edge of the bed, and the overflow escapes through openings at suitable heights in the back side of the bed. A crop of lettuce grown on this bench has required no overhead watering, and the soil remains in a strikingly porous and friable condition, especially favorable to plant growth.

The vegetation house was erected in 1893. It is a glass and wood structure, 20 by 50 feet in size, with the whole north side occupied with doors 10 feet high. Tracks extend across the house, under each door and beyond for 60 feet. Two trucks, each with a platform of 2½ by 7 feet, are allotted to each track, and on these the plants for the experiment are placed. The plants are kept in the open air in favorable weather, but on the approach of storms or chilly weather are run into the house. No provision is made for artificial heat, and the house is chiefly used in summer. In the larger number of experiments the plants are grown in zinc cans having an opening by which they may be watered from the bottom. Most excellent results have been obtained by this method of experimentation; and the vegetation house is considered one of the specially valuable appliances of the department for securing uniformity of conditions for the growth of plants under experiment.

The open ground used by the department is a very necessary part of the equipment. In it are tried many experiments that have had their preliminary tests in the greenhouse, vegetation house or laboratory. Quite a number of species of shrubs and suffruticose and herbaceous perennials are kept at hand, which in various ways lend themselves to observation and experiment in connection with many subjects of inquiry. The garden also receives the overflow of the greenhouse during the warm months, and on the other hand serves as a place for starting plants destined for winter use.

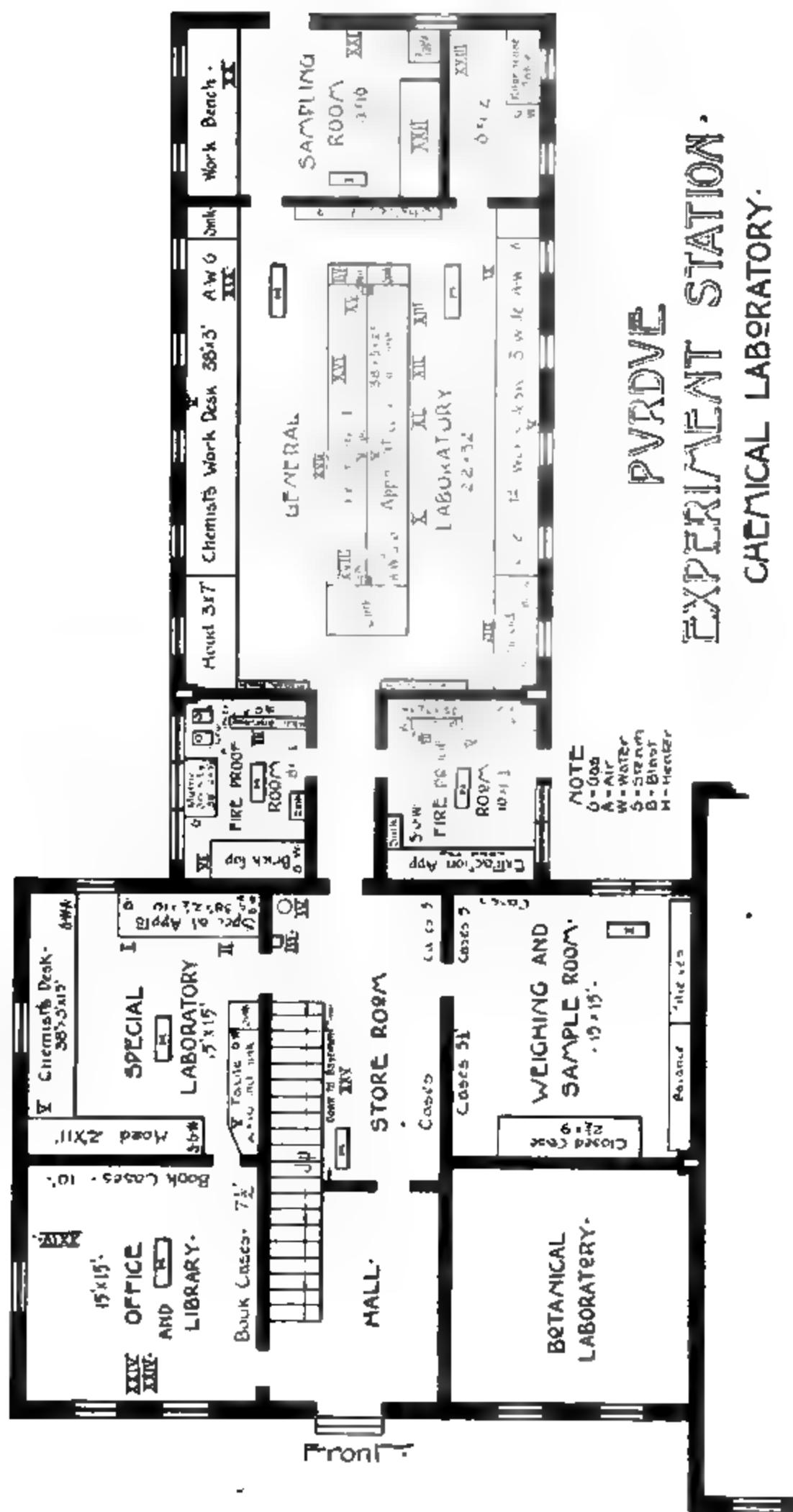
The botanical department of the Station is fitted for a wide range of experimental work, but the amount of assistance available requires that the main part of the labor be restricted to a few lines of inquiry, which so far have fallen partly in the domain of pathology and partly in that of physiology.

Respectfully submitted,

J. C. ARTHUR,
Botanist.



VEGETATION HOUSE, TRUCKS AND POTS.



FLOOR PLAN OF CHEMICAL LABORATORY. Fig. 3.

REPORT OF THE CHEMICAL DEPARTMENT.

SIR—The following is a summary of the work of the Chemical Department for the year 1896:

DESCRIPTION OF THE CHEMICAL LABORATORY.

During the past year the Laboratory has been removed from the second floor to the first floor of the east wing of the Station building, and the south wing, formerly used for storage has been finished and equipped for a Laboratory. The plan of the new Laboratory is shown in Fig. 3. It consists of nine rooms conveniently arranged for chemical work. The basement under the east wing is also used for storage. The desks aggregate 200 feet in length against 60 in the old Laboratory, and the floor space and storage room has been increased in even greater proportion. This permits a considerable space to be devoted to apparatus, which is permanently mounted, and saves much time and risk of breakage in constantly fitting up and dismounting apparatus. All permanent apparatus is supported from above as shown in plate III, and any piece of apparatus, however complex, can be removed without dismounting it or separating its parts by simply unscrewing the nut on the overhead support. Desks are equipped with gas, water, vacuum, air pressure and live steam.

Two fire proof rooms are provided for work with materials of inflammable nature, and water, steam and gas connections are carried out through the side wall to provide for specially dangerous work being conducted outside the building.

The changes made in the Laboratory and the removal to new quarters seriously interfered with the laboratory work during the summer months. But the improved facilities for work, and the increased safety of men and property, far more than offset this.

INDEX TO PERMANENT APPARATUS.

(See Fig. 3.)

- I. Apparatus for carbonic acid determinations.
- II. Stills for ammonia, fatty acids, etc.
- III. Telephone.
- IV. Washstand.
- V. Air pumps.
- VI. Combustion furnaces.
- VII. Kjeldahl distilling apparatus.
- VIII. Coils for drying green fodder, etc.
- IX. Glass blowing table.

- X. Titration apparatus.
- XI. Fiber apparatus.
- XII. Apparatus for drying in hydrogen.
- XIII. Constant temperature drying ovens.
- XIV. Special digestion apparatus with tanks.
- XV. Motors overhead, blast lamps and shafting on desk, force pumps below.
- XVI. Stirring apparatus.
- XVII. Humus apparatus.
- XVIII. Distilled water apparatus.
- XIX. Baths for phosphoric acid work.
- XX. Tools.
- XXI. Mills.
- XXII. Sampling table.
- XXIII. Glass tubing racks.
- XXIV. Office desks.
- XXV. Coat racks.

FERTILIZER EXPERIMENTS ON CLAY SOILS.

In the spring of 1896 I visited southern Indiana for the purpose of selecting suitable land for conducting fertilizer experiments with special reference to clay soils of different types. The people of that section of the State manifested a lively interest in the matter, and plats of land on the farms of Messrs. B. F. Turley and William Burton were selected in Orange County and a plat of land on the farm of Mr. George P. Campbell, in Monroe County. The crop on all these lands was corn, and the season was particularly favorable for the crop. I attended personally to the platting of the ground, the application of the fertilizers, and the weighing of the crops after the harvest. Several visits of inspection were made to the fields during the summer.

The results of the fertilizers were well defined and will appear in bulletin form. The lands were put in wheat this fall and the fertilizer tests were extended to cover more points in regard to sources of phosphoric acid and methods of application. The Station is under many obligations to Mr. B. F. Turley and Mr. Joe A. Burton, of Orleans, and Mr. George P. Campbell, of Bloomington, for their valuable assistance and hearty co-operation in the work.

The greater quantity of fertilizers used in the State is applied to the southern counties, and it seems desirable to conduct further experiments on crops in rotation in order to obtain the data necessary to give farmers reliable information in regard to the needs of typical soils of that section.

In connection with the fertilizer work on corn, an experiment on a very limited scale was made on apple trees in the orchard of Mr. J. A. Burton. One of these experiments was made on a tree infected with root rot, and the treatment caused a new bark to form on the diseased root crown. This was a matter of much surprise to those familiar with the disease. As the disease is causing widespread injury to trees in that section, the work will be continued on a much larger scale the coming season.

LABORATORY STUDIES OF AVAILABLE PLANT FOOD IN SOILS.

When the Station was established samples of soil and subsoil were drawn from all the experimental plats. At the end of five years another set of samples was taken. Considerable work was done comparing these sets of samples by the ordinary methods of analysis. No satisfactory results were obtained showing either effects of cropping or effects of application of fertilizers. An attempt was made to devise methods especially adapted to determination of available plant food. For this purpose the principle of soil absorption was used as a basis for the work on available potash, the solubility of phosphates of iron and alumina as the basis of work on phosphoric acid, and the determination of the nitrogen content of humus (suggested by Hilgard) as the basis of the work on nitrogen.

In addition to the Station soils with known history, I obtained through the courtesy of Dr. A. M. Peter, of the Kentucky Station, samples of soils from four plats of the Kentucky Station. These soils had been used for the investigations of the soil reporters of the Association of Official Agricultural Chemists, and in addition to giving us a soil of a different type with known history, they afforded samples on which very extensive analytical investigations had been conducted. Two of the soils of southern Indiana, which are from the farms under experiment for the fertilizer work mentioned above, were also included in the work. Thus we had four types of soil, all of which were under field tests.

The results of this work have been most encouraging, and I believe we have methods of obtaining the availability of plant food in soils that are superior to any heretofore proposed. The results of this work are ready for publication.

MEDICATED CATTLE FOODS.

A number of medicated cattle foods were collected and analyses of them have been completed. The analyses show that the price charged is very far in excess of the feeding value. Sometimes the price of a given weight of the food is in excess of the price of an equal weight of the highest priced medical ingredients contained in the mixture. The results of these examinations only serve to confirm the opinion that it is better, from either the financial or the health standpoint, to buy food and medicine separately.

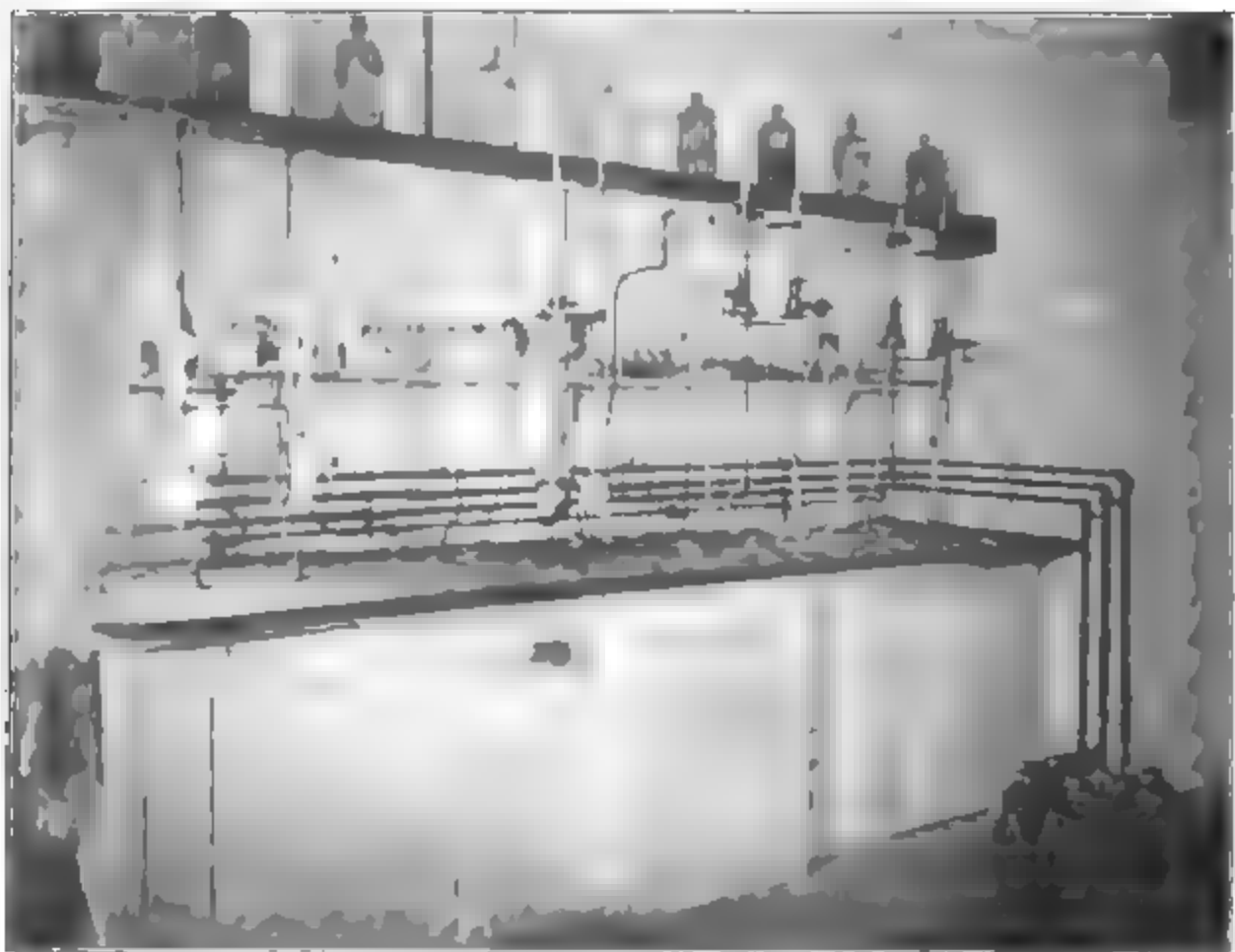
CHEESE.

A number of samples of cheese were examined with special reference to the detection of filled cheese. Several samples were found to be filled. One purpose of the work was to test the reliability of methods used for the purpose. It was found that with proper precautions there was no difficulty in detecting with certainty the presence of the fats ordinarily used in filling cheese. The saponification of the fat presents some difficulty in certain cases. This can be overcome by the use of the alcoholic saponification methods.

The removal of the fat from cheese presents some difficulty when ether and petroleum distillates are used. A method in which the casein was removed by digestion with pepsin solution was devised and found to be rapid, cheap and very efficient.



A CORNER OF THE VETERINARY LABORATORY.



PERMANENT APPARATUS DESK, CHEMICAL LABORATORY.

SUGAR BEETS.

The work on sugar beets was continued. This year the plats were so located that irrigation could be resorted to in case the rainfall was deficient. The rainfall, however, proved ample. The beets were not of high sugar content, owing to the prolonged warm weather of the autumn months.

PERSIMMONS.

The work on persimmons reported as in progress one year ago was completed, and the results have already appeared in Bulletin No. 60.

MISCELLANEOUS.

The usual number of miscellaneous materials has been received for examination. Perhaps the only one of general interest is an ash from a garbage crematory at Evansville. Analysis showed it to contain total phosphoric acid 6.86 per cent., and potash 7.50 per cent. The material would possess considerable fertilizing value, especially for lands needing potash, and the potash is in the most desirable form for such crops as tobacco. No soluble phosphoric acid was present in the material.

During the past year I have been called upon to address a larger number of Farmers' Institutes than in previous years. The farmers seem to appreciate the fact that they can meet the members of the Station staff in this way, and advice is asked on many subjects beside those on the institute program. Attendance at institutes has been the means of calling attention to matters of importance in which the Station may be of service to the agricultural interests, but which would not have come to our knowledge had we not been present in the localities where such information was needed.

Mr. J. M. Barrett has continued to act as Assistant in the Chemical Department, and his services have been eminently satisfactory.

Very respectfully submitted,

H. A. HUSTON,
Chemist.

REPORT OF THE HORTICULTURAL DEPARTMENT.

To C. S. Plumb, Director :

SIR—The past season has been, on the whole, a very favorable one for the work in horticultural lines. During the early part of the season—March and April—the amount of rainfall was somewhat below the average, being only 1.14 inches in March and 2.65 inches in April. After this, however, the rainfall was well distributed throughout the season; in fact, during July and August the precipitation was much above the average for those months during previous years. This enabled plants of all kinds to make a steady and rapid growth throughout the season. The temperature during the early part of the season was considerably higher than normal, so that all kinds of fruits and vegetables made a very rapid growth, and ripened about two weeks earlier than usual.

The first strawberries were ripe on May 16, raspberries on June 7, and the Early Harvest blackberries were ready to pick on June 16, which is fully two weeks earlier than the usual time of ripening. The crop was unusually fine.

As was stated in my report for 1895, the greater portion of the Russian apples which were planted ten years ago are not adapted to a climate so far south as this, and so, during the past season, a portion of the trees were top-worked with the following varieties, which were received from the United States Department of Agriculture, Washington, D. C.: Millroy's Favorite, Queen of the West, Bloomfield, York Imperial, Staymen, Winesap, Avera, Alabama Pippin, Elston, Pilot, Abraham, Minkler, Jackson, Benninger, Senator, Ontario, Hedrick Sweet, Snyder, Celestia, Great Bear, McIntosh Red, Oglesby, Bonum, Nero, Arnold, Red Carver, Bethlehemite, Palouse, Upp, Bancroft, Gem Sweet, Otoa, Virginia Beauty, Rittenhouse, Seek no-further (from York, Pa.), Gerard, Lily of Kent, Dixon, Shiawasse, Brown Mammoth, Stringtown, Mumper, York Stripe, Nordhouse and Lankford. It is the intention to top-work all of these trees as soon as it is possible to do so.

NOTES ON CHERRIES.

The following nineteen varieties of cherries fruited this season, and while a few of them are of superior quality and warrant further trials, the most of them are in no way superior to the old Early Richmond. Spate Amerelle is medium size, bright red, tough skin and of fair quality, ripens June 25; Brusseler Braune is large, of dark color, stem two inches long and of very fine quality, and ripens June 25; Ostheim is large, rather dark color, ripening June 16; Montmorency

Extraordinary is of medium size, bright red color, short stem and good quality, and ripens June 10; Fouhe Morello is large, bright red, with a short stem, fine quality, and ripens June 8; Montmorency is large, bright red color, ripening June 22. This is one of the best on the list. Wragg is medium size, dark red color and good quality. The tree is low and spreading, and ripens June 25. French Morello is large, dark color, good quality; tree an upright grower; ripens June 25. Lutovka is large, bright red, deep suture, stem $1\frac{1}{2}$ inches long, fine quality and ripens June 10. So far this variety has been a very shy bearer, otherwise it is an excellent variety. Dye House is another medium sort, no better than many others. Griotte Du Nord is large, dark color, long stem and good quality; it ripens June 20. Double Natte is medium size, bright red in color, ripens June 8, and no better than many others. Carnation is a sweet cherry, very large, bright red, rich and meaty and ripens June 8; this is one of the best. Wier No. 2 is only medium in all respects. Bessarabian is medium in size, bright red, long stem, (two inches), very good but not prolific. Cerise De Ostheim is medium size, dark red, long stem, very good quality, much like Bessarabian, but much more productive; ripens June 20. Frauendorfer is medium size, dark red, medium stem, not productive; ripens June 25.

PLUMS.

Among our native plums the Wolf and Robinson have given the best satisfaction. The Burbank is unquestionably the best of the Japanese class for this climate. Among the European class which fruited this season, the Communia was the most productive, while the Yellow Aubert is the largest and finest in appearance. It, however, is very subject to rot, so that it is with great difficulty that a crop is secured in good condition. The other varieties which fruited do not seem to be superior in any respect to many of our old well known varieties.

DENDROLENE AS AN INSECTICIDE.

Among other things which have been sent to this department for trial was a package of Dendrolene, sent by the Bowker Fertilizer Co., of Boston. They asked that it be given a thorough trial on various kinds of fruit and shade trees for the purpose of determining its effectiveness in keeping out borers and other noxious insects and also as a protection against mice and rabbits. The material was applied to a number of young healthy stock trees of Champion, Crosby and other varieties of peach and also to a number of the same varieties bearing their first crop of fruit. A number of young apple trees, just transplanted, were also coated. The material was applied in May, according to directions, by coating the trunks of some trees from the ground to the lower limbs, and to others only about half way up. On examination about the middle of August, it was found that several of the young peach trees were beginning to drop their leaves and to show signs of general debility. A little later the older trees began to show signs of trouble, and on making a careful examination of the trees about the first of September, it was found that the

material had been absorbed by the bark to such an extent as to shut off the circulation of sap completely, and that the inner bark or cambium had turned black and was apparently dead. The same was true to a somewhat less extent in case of the young apple trees, so that a month later every peach tree and most of the apple trees to which the material was applied were dead.

The results from these experiments and information which I have received from other sources have led me to conclude that the material in its present form is not safe to use on young peach trees in this section, and I would not recommend its use on any tree until we have had an opportunity to test it more fully.

CLOSE ROOT PRUNING TREES.

The question of close root-pruning trees has been attracting the attention of fruit growers and nurserymen of late, especially in the Southern States. In order to ascertain whether this method would be suitable to this climate or not, an experiment was planned last spring, by which four trees each of standard and dwarf pears, cherry, prune, peach and quince were selected for trial. Two trees each of these varieties were pruned so that not more than an inch or two of the roots remained, and the tops were entirely removed. The remaining two were planted in the ordinary way. These trees were all photographed before planting, and after having grown during the season, they were taken up and photographed again. The result of this experiment showed that the peach was capable, after being deprived of all its roots and branches, of producing a magnificent root system and a top to correspond. The Dwarf pear, Standard pear, German prune and Early Richmond cherry came next in order. The latter making very little root development on the pruned trees.

It should be borne in mind that the season was an exceptionally favorable one for this experiment. A dry season might produce entirely different results; for that reason the experiment will be continued for a series of years.

BEES VS. GRAPES.

Many fruit growers are firm in the belief that honey bees do great damage to the grape crop during the ripening period, by cutting the skin and sucking the juice. I have not been able to find where any definite experiments on this subject have been conducted; so during the latter part of August, as the Worden grapes were beginning to ripen, a colony of bees was placed close to the grape vine, and mosquito netting stretched over both vine and bees, so as to allow plenty of room for flying about, but not allowing the bees to get outside where they could gather food. They were kept confined for three weeks, and in the meantime the grapes had become thoroughly ripe; but by making close observations at different times during the period, not a grape was found to have been punctured. Outside the inclosure wasps were very busy cutting the skin of grapes and sucking the juices. We conclude, therefore, that in the absence of wasps, the grape grower will suffer but little, if any, from this cause.

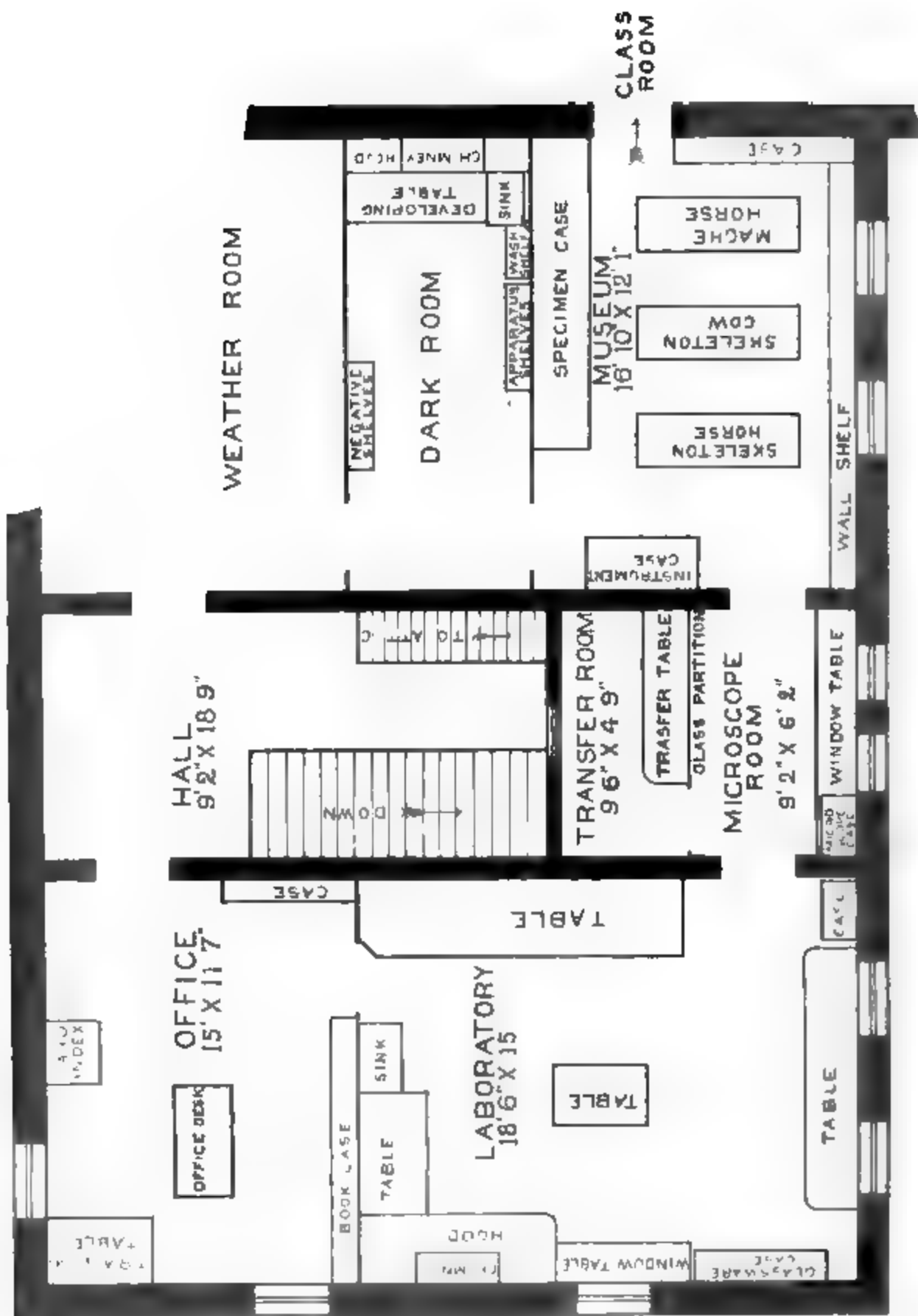
OTHER EXPERIMENTS BEGUN.

Last September this department received a request from the Chief of the Division of Forestry, Department of Agriculture, Washington, D. C., to co operate with other experiment stations in an investigation having for its object a study of the effect of locality on forest tree seedlings. In commencing this experiment we have already received a large number of seeds of different varieties of forest trees from twenty-one different States and Territories. These seeds will be planted the coming spring and the results carefully watched.

This department also has under way among other things an experiment having for its object a study of bud variation on the branch, and also by its position on the tree.

Very respectfully submitted,

JAS. TROOP,
Horticulturist.



FLOOR PLAN OF VETERINARY LABORATORY. Fig. 4.

REPORT OF THE VETERINARY DEPARTMENT.

To C. S. Plumb, Director :

SIR—I herewith submit a report of the work of the Veterinary Department for the year 1896.

Hog Cholera and Swine Plague. The first work was the completion of Bulletin No. 59, upon "Hog Cholera and Swine Plague in Indiana" published in February. The bulletin deals largely with the sanitary measures to be employed in checking this disease. Studies have been conducted along the same lines during the year, to learn still more of preventive measures, especially those that might be employed by all farmers in protecting their stock. The observations recorded in the bulletin have been corroborated to a large extent through reports which were received quarterly from about 150 correspondents. These settle in a certain degree some of the disputed points concerning the season when the disease is most prevalent, causes, etc.

An inquiry was also conducted relative to the spread of disease by exhibition at State and county fairs. A letter was addressed to each exhibitor at the Indiana and Ohio State fairs and to a large number of exhibitors at the county fairs. The result of this correspondence leaves no doubt as to the danger that may arise from such exhibitions, and also the importance that should be attached to disinfection of pens at these fairs. Upon my report to the State Swine Breeders' Association, a recommendation was made by them to the Legislature to enact a law to require disinfection of exhibition pens by fair associations.

A complete study of the distribution of the disease, by counties from 1882 to 1890 and by townships for 1895 and 1896 has also been made. These have been plotted on maps and are ready for publication. As this is the most destructive disease in the State, it is worthy of special study. The loss in 1895 was \$3,250,000.

Tuberculosis. The bulletin upon tuberculosis, issued in December, embraces the study made upon that disease.

Actinomycoxis, or lumpy jaw, was treated in ten head of cattle. The treatment consisted of doses of a drachm to a drachm and a half of iodide of potash once a day for two weeks, and a repetition at the end of one week in those cases in which it was necessary; 80 per cent. made recovery.

An extended study of the bacteria in stables was made during the first half of the year. This work was largely done by Mr. Charles E. Davis, a senior student. Eighteen forms of bacteria are described in detail and a full account is given of the conditions under which the germs and number of germs were taken. As a preliminary study upon stable hygiene, the work had considerable value.

A number of other problems, such as the treatment of fistula and poll evil, the testing of new remedies, as antiseptics and disinfectants, a new spaying fluid (?), hog cholera cures, etc., were conducted as far as time would permit.

An attempt was also made to collect statistics from Veterinarians upon the occurrence of disease during the year. During the first six months the reports were quite satisfactory, and summaries were published. During the last half, the reports were too irregular to give all the value to the work that is desired and a report has not as yet been published. These reports are of considerable value as indicating the number of cases occurring at different seasons of the year and under different conditions. The work will be continued, using a different system of collecting data, which it is hoped will result in greater success.

The department has been called upon to do a large amount of Institute work and to give addresses before county and State breeders' associations. The requests, in many cases, have been denied, as the duties in the class room and laboratory are of primary importance.

The improvement in the quarters for the department during the past year have been greater than at any previous time since its establishment. The rooms now occupied are sufficient for most of the purely laboratory research work. The department occupies the second floor in the east end of the Experiment Station building. Six rooms comprise the suite; office, laboratory, room for microscopy, transfer room, dark room and specimen room. The last mentioned is connected with the class room and is used more for college purposes than for Station work.

The office room is about 11½ feet by 15 feet and contains a part of the Station library on veterinary Science, and the private library and card index belonging to the head of the department. The library is particularly strong in journalistic literature, and an attempt has been made to procure a complete file of all veterinary journals published in English from 1825 to date. The effort has only been partially successful, as a few volumes and numbers are not obtainable. The card index numbers over 30,000 references to veterinary literature. While these are private property, the Station has had their usage.

The Laboratory is 15 feet by 18½ feet. It is fitted with the usual tables and a hood. Space is economized as far as possible by fitting the under part of the tables with drawers and closets. The tables are piped with gas, water, steam and air. Cases and shelves utilize all available wall space. The Laboratory is fitted with the usual appliances for all ordinary work in pathology and bacteriology. A Zeiss microscope of late pattern with full complement of eye pieces and objectives, a Bausch and Lomb laboratory microtome with a carbonic acid freezing attachment, baths, ovens, steam and dry sterilizers, culture apparatus for bacteriological work, centrifuge and a full line of imbedding and straining reagents, etc.

The room for microscopy is small, only about six and a quarter by nine feet, but well suited for the purpose.

The transfer room is separated from the microscopic room by a glass partition. It is four and three-quarters by nine feet and is provided with the usual glass-top table and a constant temperature oven.

The dark room is 6 feet 10 inches by 16 feet 10 inches, and is well equipped for the work. A large camera, 6½ by 8½ inches, provided with rectilinear and

wide angle lenses, and a smaller camera, 4 by 5 inches, with a rectilinear and a wide angle lense, are at the disposal of the Station. Special apparatus for photomicrography has been devised in the department, so that the equipment permits a wide range of record work.

The museum room is about 12 by 17 feet. It connects the department with the class room, and is used largely for storing material for class-room demonstration. It is also used for storing all pathological material used in Station studies. The surgical instruments, of which there is a very full line, are kept here.

The hospital building is inadequate for any experimental work, except the simplest kind. It serves as a protection for guinea pigs and rabbits during the winter, and for experiments where only one or two animals are employed. Until a suitable building for this branch of the work is provided, the work of the department will be greatly handicapped.

The illustration on page 392 shows the general floor plan of the office, laboratory rooms, etc.

Respectfully submitted,

A. W. BITTING, D. V. M.,
Veterinarian

APPENDIX.

ACKNOWLEDGMENTS.

The following gifts have been made to the Station during the year, and to the givers of these thanks are herewith rendered:

United States Department of Agriculture, Washington, D. C. Numerous publications, seeds, etc.

A. G. Young, Register, Augusta, Maine. Maine Registration Report for 1893.

D. McAlpine, Botanist, Department of Agriculture, Victoria, Australia. One copy "The systematic Arrangement of Australian Fungi, together with Host index and list of works on the subject," by D. McAlpine.

Patterson Parchment Co., Passaic, N. J. One thousand sheets parchment paper for butter prints.

Polar Creamery Co., Lafayette, Ind. One floating bulb thermometer. Repairs to creamer.

W. Atlee Burpee, Philadelphia, Pa. Packages of flower and vegetable seeds.

O. C. Gregg, Superintendent, Minneapolis, Minn. One copy of Eighth Annual Report Minnesota Farmers' Institutes.

B. W. Chipman, Secretary, Halifax, Nova Scotia. Annual Report of the Secretary of Agriculture for Nova Scotia for 1895.

Edwin Taylor, Secretary, Topeka, Kansas. Fourth Annual Report of the Kansas Horticultural Society for 1894-'95.

F. Barteldes & Co., Lawrence, Kansas. One-fourth pound white Kafir corn seed.

C. W. Bush, Granville, Ill. One peck of Early Jewell oats.

Richard Nott, Burlington, Vt. Sample Nott's No. 96 pea.

F. D. Coburn, Secretary, Topeka, Kansas. Numerous reports of the Kansas State Board of Agriculture.

Librarian Oberlin College, Oberlin, Ohio. Bulletins of Oberlin College.

F. W. Kirk, Biologist, Wellington, New Zealand. Reports from the New Zealand Department of Agriculture.

Willam Weld & Co., London, Ontario, Canada. Copy engraving "Canada's Glory."

West Disinfecting Co., New York City, and J. C. Tarkington, Agent, Indianapolis, Ind. Chloro-Naphtholeum.

N. W. Ayer & Sons, Philadelphia. One copy of the "Manual for Advertisers."

Prof. W. P. Brooks, Amherst, Mass. Seeds of Japanese millet and soy beans.

B. F. Albaugh & Son, Covington, Ohio. Basket of plants.

John K. King, Coggeshall, Essex, England. Seventeen sample packages of cabbage, tomato, radish, beet and mangel seed.

James Riley, Thorntown, Ind. Three quarts Riley's Favorite and three quarts of Boone County White seed corn.

Bowker Fertilizer Co., Boston, Mass. One pail (20 pounds) dendrolene.

Gale Manufacturing Co., Albion, Mich. One No. 11 Albion Steel Cultivator.

W. W. Miller, Secretary, Columbus, Ohio. Reports of the Ohio State Board of Agriculture from 1886-1895, inclusive.

Chas. F. Kennedy, Secretary, Indianapolis, Ind. Annual Report Indiana State Board of Agriculture.

I. M. Kellogg, Ionia, Mich. Automatic runner cutter. Perfection plant setter. Twenty-five plants each of twelve varieties of strawberries, seven varieties raspberries, three of blackberries and two of currents.

J. D. Frederickson, Little Falls, N. Y. One box Champion carrot seed and one box Jersey Giant parsnip seed.

Deming Co., Salem, Ohio. One spraying nozzle.

Mortimer Levering, Lafayette, Ind. One private flock register.

Henry A. Dreer, Philadelphia, Pa.; James Vick's Sons, Rochester, N. Y.; Joe. Breck & Sons, Boston, Mass.; Peter Henderson & Co., New York City; Jas. Veitch & Sons, Chelsea, S. W., London, England; B. S. Williams & Son, Upper Holloway, London, N., England; William Bull, Chelsea, London, England, and Ernest Benary, Erfurt, Germany. Packages of seeds of cineraria and calceolaria.

German Kali Works, New York City. One bag each of muriate and sulphate of potash.

W. R. Sessions, Secretary, Boston, Mass. Report Massachusetts State Board of Agriculture for 1895. Report on "The Gypsy Moth for 1896."

Fred. C. Schraub, Commissioner, Albany, N. Y. Second Annual Report of the Commissioner of Agriculture.

William Trelease, Director, St. Louis, Mo. Report of the Missouri Botanic Gardens for 1896.

L. A. Goodman, Secretary, Westport, Mo. Thirty-eighth Annual Report Missouri State Board of Agriculture for 1895.

Chas. P. Loundsbury, Entomologist, Cape Town, South Africa. Report of Government Entomologist for 1895.

Prof. C. A. Zavitz, Guelph, Ontario. Three pounds of Dawson's Golden Chaff wheat.

Mosure & Co, Vera Cruz, Ind. One Magic post hole digger.

S. C. Bassett, Secretary, Gibbon, Neb. Report for 1895 of Nebraska Dairy-men's Association.

Dr. F. B. McNeal, Commissioner, Columbus, Ohio. Report Ohio Dairy and Food Commissioner for 1895.

Hon. John Dryden, Minister of Agriculture, Ottawa, Ontario, Canada. Numerous agricultural reports.

HERD BOOKS.

Mortimer Levering, Secretary, Lafayette, Ind. Vol. II American Shetland Stud Book, and Vol. II of the American Shropshire Sheep Record.

W. A. Shafor, Secretary, Middletown, Ohio. Vol. VI American Oxford Down Sheep.

J. McLain Smith, Secretary, Dayton, Ohio. Vol. VII of the Red Polled Herd Book.

J. H. Miller, Secretary, Peru, Ind. Vol. I American Polled Durham Herd Book.

N. R. Pike, Secretary, Winthrop, Maine. Vol. VIII of the Maine State Jersey Cattle Association.

C. R. Thomas, Secretary, Independence, Mo. Vol. XV of the American Hereford Record.

W. H. Caldwell, Secretary, Peterboro, N. H. Vol. for 1896 of the American Guernsey Cattle Club.

Carl Friegau, Secretary, Dayton, Ohio. Vol. XVIII Ohio Poland-China Record.

George F. Woodworth, Secretary, Marysville, Mo. Vols. I-IX Standard Poland-China Record.

PERIODICALS.

The publishers of the following periodicals have kindly sent them to the Station during the year. These are leading journals, and are used for frequent consultation, both by the Station staff and the agricultural students of the University:

UNITED STATES.

Agricultural Epitomist	Indianapolis, Ind.
American Creamery	Chicago, Ill.
Agricultural Student	Columbus, Ohio.
American Cultivator and Poultry Keeper	Los Angeles, Cal.
American Fertilizer	Philadelphia, Pa.
American Florist	Chicago, Ill.
American Gardening	New York, N. Y.

American Grange Bulletin	Cincinnati, Ohio.
American Horticulturist	Wichita, Kan.
American Sheep Breeder and Wool Grower	Chicago, Ill.
Baltimore Sun (weekly)	Baltimore, Md.
Breeders' Gazette	Chicago, Ill.
Call (weekly)	San Francisco, Cal.
Colman's Rural World	St. Louis, Mo.
Creamery Journal	Waterloo, Iowa.
Drainage Journal	Indianapolis, Ind.
Elgin Dairy Report	Elgin, Ill.
Experiment Station Record	Washington, D. C.
Farm and Dairy	Ames, Iowa.
Farm and Fireside	Springfield, Ohio.
Farm and Home	Chicago, Ill.
Farm, Field and Fireside	Chicago, Ill.
Farm Journal	Philadelphia, Pa.
Farm Poultry	Boston, Mass.
Farmers' Call	Quincy, Ill.
Farmers' Guide and Home Companion	Huntington, Ind.
Farmers' Home	Dayton, Ohio.
Farmers' Magazine	Springfield, Ill.
Farmers' Review	Chicago Ill.
Field and Farm	Denver, Colo.
Grange Visitor	Lansing, Mich.
Hoard's Dairyman	Fort Atkinson, Wis.
Holstein-Friesian Register	Brattleboro, Vt.
Home and Farm	Louisville, Ky.
Indiana Farmer	Indianapolis, Ind.
Industrial American	Lexington, Ky.
Industrialist	Manhattan, Kan.
Iowa Homestead	Des Moines, Iowa.
Jersey Bulletin	Indianapolis, Ind.
Journal of Agriculture	St. Louis, Mo.
Kansas Farmer	Topeka, Kan.
Live Stock Journal	Indianapolis, Ind.
Live Stock Report	Chicago, Ill.
Market Garden	Minneapolis, Minn.
Michigan Farmer	Detroit, Mich.
Mirror and Farmer	Manchester, N. H.
Montana Fruit Grower	Missoula, Mont.
National Stockman and Farmer	Pittsburgh, Pa.
Nebraska Farmer	Lincoln, Neb.
New England Farmer	Boston, Mass.
New England Florist	Boston, Mass.
New York Produce Review	New York, N. Y.
Ohio Farmer	Cleveland, Ohio.

Orange Judd Farmer	Chicago, Ill.
Oregon Agriculturist	Portland, Oregon.
Pacific Coast Dairyman	Tacoma, Wash.
Pacific Rural Press	San Francisco, Cal.
Practical Dairyman	Chatham, N. Y.
Practical Farmer	Philadelphia, Pa.
Prime's Crop Bulletin	Dwight, Ill.
Progre-sive South	Richmond, Va.
Public Ledger (daily)	Philadelphia, Pa.
Reliable Poultry Journal	Quincy, Ill.
Rural Northwest	Portland, Oregon.
Silent Hoosier	Indianapolis, Ind.
Southern Cultivator and Dixie Farmer	Atlanta, Ga.
Southern States	Baltimore, Md.
Southern Farmer	New Orleans, La.
Success with Flowers	West Grove, Pa.
Sugar Beet	Philadelphia, Pa.
Wallace's Farmer and Stockman	Des Moines, Iowa.
Weather and Crops	Chicago, Ill.
Western Soil Culture	Minneapolis, Minn.
Wisconsin Agriculturist	Racine, Wis.

The following periodicals have been received during the year from Indiana publishers :

Advertiser, The	Medarysville.
Enterprise, The	Richmond.
Herald, The	Cayuga.
Herald, The	Jasper.
Herald, The	Lyon.
Home Journal, The	Lafayette.
Hoosier State, The	Newport.
Journal, The	Osgood.
Journal, The	Rossville.
Lafayette Commercial Gazette	Lafayette.
Leader, The	Newburgh.
Magnet, The	Angola.
Mail, The	Columbia City.
Mail, The	Milford.
Mennonische Rundschau	Elkhart.
News, The	Petersburg.
Recorder	Rising Sun.
Register, The	Crown Point.
Times, The	Parker City.
Wayne Farmer, The	Hagerstown.

FOREIGN.

Agricultural Gazette of New South Wales	Sydney, Australia.
Farmers' Advocate	London, Ontario, Can.
Farming	Toronto, Ontario, Can.
La Produccion Argentina	Buenos Ayres, Arg. Rep.

In addition to the above, the following periodicals are subscribed for by the Station and are on file for reference:

Analyst, The	London, England.
Annalen der Chemie	Leipzig, Germany.
Berichte de Deutsche Botanische Gesselschaftlichen	Berlin, Germany.
Botanische Centralblatt	Cassel and Marburg.
Botanische Zeitung	Leipzig.
Bulletin de la Societe Chemique de Paris	Paris, France.
Centralblatt für Bakteriologie und Parasitenkunde	Jena, Germany.
Entomologist	London, England.
Gardener's Chronicle	London, England.
Journal für Landwirthschaftlicher	Berlin, Germany.
Journal of the Royal Agricultural Society of England . .	London, England.
Journal of the Chemical Society	London, England.
Landwirthschaftlichen Jahresbucher	Berlin, Germany.
Live Stock Journal	London, England.
Veterinary Journal	London, England.
Veterinarian	London, England.
Zeitschrift für Analytische Chemie,	Wiesbaden, Germany.
Zeitschrift für Pflanzenkrankheiten	Stuttgart.

TREASURERS' REPORT EXPERIMENT STATION.

As Treasurer of Purdue University, I hereby submit my report of all moneys received during the year ending June 30, 1896, on account of Experiment Station funds.

From U. S. Government	\$15,000 00
From farm receipts	1,091 02
Total	\$16,091 02

J. M. FOWLER,
Treasurer Purdue University.

FINANICAL STATEMENT.

The Agricultural Experiment Station of Indiana in account with the United States, for year ending June 30, 1896.

DEBIT.

Received of Treasurer of the United States—Receipts as shown by the Treasurer's report	\$15,000 00
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CREDIT.

Salaries	\$8,197 70
Labor	3,049 30
Publications	1,523 34
Postage and stationery	143 59
Heat, light and water	401 50
Seeds, plants and sundry supplies	478 92
Feeding stuffs	292 06
Library	171 92
Tools, implements and machinery	179 64
Chemical supplies	156 23
Freight and express	88 16
Fertilizers	26 24
Furniture and fixtures	23 85

BOARD OF AGRICULTURE.

Scientific apparatus	\$39 20
Live stock	76 75
Traveling expenses	46 15
Contingent expenses	31 61
Building and repairs	73 84
Total	<u>\$15,000 00</u>

I hereby certify that the above is a correct statement of expenditures in Station fund for year ending June 30, 1896.

E. A. ELLSWORTH,
Secretary Board of Trustees.

IMPROVEMENT FUND EXPERIMENT FARM FOR YEAR ENDING
JUNE 30, 1896.

DEBIT.

Balance June 30, 1895	\$1,148 23
Receipts from farm for 1896	1,091 02

CREDIT.

Salaries	\$392 02
Labor	422 72
Heat, light and water	125 00
Publications	23 20
Postage and stationery	10 35
Freight and express	26 18
Seeds, plants and sundry supplies	62 72
Feeding stuffs	14 00
Tools, implements and machinery	19 08
Furniture and fixtures	10 75
Scientific apparatus	26 44
Live stock	10 90
Traveling expenses	26 95
Contingent expenses	83 00
Building and repairs	55 31
Balance	930 63
	<u>\$2,239 25</u> <u>\$2,239 25</u>

I hereby certify that the above is a correct statement of expenditures from improvement fund for year ending June 30, 1896.

E. A. ELLSWORTH,
Secretary Board of Trustees.

BULLETIN No. 58. VOL. VII. FEBRUARY, 1896.

HOG CHOLERA AND SWINE PLAGUE IN INDIANA.

BY A. W. BITTING

HISTORICAL.

By many breeders, hog cholera is regarded as of recent introduction into the State, and they often refer to a time twenty years ago when it was unknown. While it will probably never be known when the first outbreak occurred in the State, the report of the Bureau of Animal Industry* contains the following interesting paragraph:

"The correspondence on this subject can only be briefly summarized in this bulletin. The first outbreak of disease supposed to be hog cholera that was referred to, occurred in Ohio in 1833. It was reported from one county in South Carolina in 1837, and from one in Georgia as having occurred in 1838. It existed in 1840 in one county in Alabama, one in Florida, one in Illinois and one in Indiana."

If this was the first outbreak of the disease in the State, it dates back farther than is credited in popular articles upon the subject. In the first State Agricultural Report (1859-1860), a leading article is upon hog cholera. It refers to frequent outbreaks of the disease and the heavy loss it had caused. The contagious nature of the disease seems to have been well understood, and the preventive measures recommended are in the main the same as those advised at the present. These outbreaks became more frequent, and the industry suffered to such an extent that the Legislature of 1867 passed a law requiring the burning or burial of all carcasses of animals dying from the disease. The law is still upon the statute books, but would be more effective if enforced. The State Agricultural Reports make reference to the disease in many of the volumes succeeding that of 1859.

STATISTICAL.

The total loss from all swine diseases reaches a very high figure, as is shown by the annual report of the State Statistician. That hog cholera and swine plague are productive of a very considerable part of it can not be questioned. In 1886 it was estimated that 80 per cent. of all hogs that died were victims of hog cholera. The following table shows the number that died in the State during the nine years in which a record was kept:

*Hog Cholera, p. 9, Bureau of Animal Industry, 1889.

1882-1883	288,286
1883-1884	351,156
1885	326,555
1886	402,164
1887	512,692
1888	326,859
1889	247,114
1890	256,991
1894	278,143

No record was kept for the years 1891, 1892 and 1893, and the data for 1895 is not yet available, but the number will probably equal that of any preceding year.

The annual loss for the United States is estimated at from \$10,000,000 to \$25,000,000. Indiana ranks about fourth among the pork producing States, and loses her share of pigs from disease.

From data recently collected, our estimate for the loss in the State for 1895 was \$2,500,000. In some localities not enough hogs were left for breeding purposes.

CHARACTERISTICS OF THE DISEASES.

The diseases of swine have been investigated by the Bureau of Animal Industry for several years. The bureau officials determined that we have two widespread diseases among hogs in this country, hog cholera and swine plague. Both diseases are caused by a microbe or germ, occur under similar conditions and have general symptoms so much alike that it is difficult to distinguish between them. Because of such strong similarity both will continue to be called hog cholera by pork producers.

The diseases differ in these respects: The germs of hog cholera are larger than those of swine plague; they are more resistive of climatic conditions and other influences that affect low forms of life; they obtain entrance into the body through the food, water and air; young pigs are especially susceptible and may die when older ones have only a mild attack or escape altogether. The intestines are the primary seat of affection. The disease is more persistent and more readily communicated than swine plague.

The germs of swine plague are believed to gain entrance into the body mainly with the air when breathed; the older and fatter animals suffer greatest fatality; the lungs are the primary seat of affection.

The symptoms of the two diseases may be described together. They vary much according to the severity of attack. Often the hog will be found dead before it is known to be ailing, while in chronic cases it may be sick for two or three weeks. The condition of the eyes give early indications of disease, the mucous membranes become reddened, the lids gummy and glue together. The pigs appear chilly and lie in the hot sun when they would ordinarily remain in the shade. They will hunt for litter or bedding under which they can secrete themselves. The appetite is lost and a diarrhea is developed. In the earliest stage, constipation may be

present, but diarrhea nearly always ensues before the attack is over. The attack may or may not be attended with a cough which may be frequent or only when the animal gets up from its bed. In breathing, the ribs seem to remain quiet, and a quick jerk is seen in the flank at each expiration; lameness in one or more limbs; stiffness of the back; thickening and cracking of the ears; scabs on the skin; purpleness of the belly or patches on the body are all attendant. A common expression from the farmer is that, "No two die alike." In swine plague the respiratory symptoms are early developed and more characteristic than in hog cholera. On post mortem the intestines and lungs are found to be the points of attack.

Little is known regarding the life history of the germs outside of the body, but it is known that the disease can not develop without their presence. As medical treatment of the diseased animals has given very unsatisfactory results, it is found to be far more important to prevent the disease getting an entrance into the system than to attempt to cure, it became the object of this preliminary study to determine whether the disease could be prevented and whether the means of preventing it were practicable. There is little trouble in finding an occasional pork producer who has been in the business for years and has never lost a case, while his neighbors have lost repeatedly. What are the differences in their methods? Rather than take the experience of these exceptional men, I addressed a circular to one hundred and nine breeders in the State who are in the business for producing stock for breeding purposes. The addresses were obtained from their advertisements and were scattered well over the State. They were selected because their methods are the best, their conditions reasonably good, and because they give much attention to the breeding and care of their stock. As far as external conditions were concerned they were more exposed to contagion than their neighbors, as many exhibited at fairs, made purchases, and were more or less visited.

The following questions were asked :

How many hogs do you raise each year? Have you had cholera in your herd during the past year? If so, how many hogs died? How introduced, if known? How close did the disease come to you? Was the loss light or heavy? What is the source of your water supply and how given to the hogs? If you escaped, what precautions were taken to prevent it? Give briefly your method of handling hogs

SUMMARY OF TABLE.

Ninety-five made reply, as shown by the accompanying table.

The ninety-five breeders produced about 11,000 hogs, of which they lost 822, or approximately eight per cent., during a year of severe trial. Seventy-two breeders escaped the disease; twenty-three had it. Ten of the breeders could not account for its introduction into their herds; one fails to state how it was introduced, if known, and twelve account for its occurrence. The disease was on adjoining farms or within one-half mile of fifty-five, in the neighborhood of seventy-six, and not in the vicinity of seventeen. Sixty-two reported that the losses were severe, and fourteen that they were light. Eighty-two had used wells or springs as the source of water supply; thirteen used surface water or permitted

access to it. The preventives recommended are pure water; cleanliness of quarters; removal of litter; care in feeding, particularly new corn; dividing the herd into bunches according to the age and breeding to mature hogs. In addition to the concentrated foods, liberal allowance of salt, ashes and charcoal were very generally recommended.

From the foregoing table it seems that the following conclusions are warranted: The total loss was very low, compared with the loss in the State as a whole. One-third of the loss is accounted for by the owners as having been caused by exhibiting at fairs, by purchases, by bringing in hogs to breed, etc., a loss the owners state they believe they might have avoided.

The better surroundings and care must have been their safeguard. These same conditions are practical and attainable by every farmer. The large number that responded from such widely different quarters eliminates very largely the possibilities of their having been "fortunate."

PREVENTIVE MEASURES.

One of the first and a very important step in the prevention of the disease is to obtain pure water. This can not be more easily secured than from a deep well and supplied to the animals in troughs or stock fountains, but permitting no wallows. There can be little doubt but that hog cholera was present on many farms this past year where the water would test free from these germs, yet the possibilities of infection are increased many fold if the supply comes from a source to which the germs have access. For this reason surface water must always be looked upon as a possible source of infection.

The quarters should be clean and the litter either removed or burned once a week. The hog is as much in need of a clean bed frequently changed as is the horse or cow. The strawstack is an objectionable place for sleeping quarters. A cheap board platform has many advantages over mud as a feeding floor.

The disease is frequently attributed to the feeding of new corn. This article of diet can not cause the disease, but if fed injudiciously it may produce a condition of the system that will offer little resistance to disease. The change of diet to new corn should be accomplished gradually. Mixed feed, adjuncts of bran, linseed meal, etc., all have their use and act most beneficially. The swine breeders almost without exception use a liberal supply of charcoal, salt and ashes. The charcoal and ashes can be obtained by raking the cobs in a pit once a week and burning. Use about one-eighth or tenth as much salt as charcoal and ashes. In addition to supplying mineral matters to the food the practice keeps the premises clean.

The means of carrying the disease from one place to another are numerous. Sick hogs roaming on the public highway or being driven to market, collectors for soap factories, dogs, buzzards, visitors, are factors in its dissemination. Several outbreaks have been traced to the shipping cars. How far the stock cars are factors in distributing the pest can only be conjectured.

When an outbreak occurs upon a farm, the healthy animals should be separated from the sick as removal of the sick hogs from the herd does not remove the excreta and other matters containing the contagion. The herd should be divided so that all can be observed, and thus not expose so many each time a case develops. Dead hogs should be buried or burned, preferable the latter, as it is the sure means of destroying the germs. If buried, it should be deep (at least four feet), in a place where hogs will not graze for a year. Shallow burial is dangerous, as it affords protection to the germs for the coming year. It is not unreasonable to expect outbreaks will result in 1896 from such practice. It is not known how long the germs will live in the buried carcass, around strawstacks, in the litter in pens and yards. This is being investigated.

The introduction of new stock into pens or yards where the disease has been is attended with risk. How much time should elapse will depend somewhat upon the conditions of the weather, but we are not prepared with sufficient data to make a recommendation. A hog that has been afflicted and apparently recovered, should not be returned to the herd under three or four weeks.

We can not recommend medicinal treatment in the light of our present knowledge. The U. S. Prescription has proved as efficacious as any we have heard of the past season. It has a composition as follows :

Wood charcoal	1 pound.
Sulphur	1 "
Sodium chloride (common salt)	2 "
Sodium bicarbonate (baking soda)	2 "
Sodium hyposulphite	2 "
Sodium sulphate (Glauber's salts)	1 "
Antimony sulphide	1 "

A tablespoonful for each hog is given in sloppy feed once a day.

INVESTIGATIONS OF STATE BOARD OF COMMERCE.

In January, Mr. E. B. Martindale, of Indianapolis, President of the State Board of Commerce and Chairman of the Committee on Legislation from the State Swine Breeders' Association, sent out a list of questions through the state press, relative to hog cholera. The points covered were essentially the same as those sent out by the Experiment Station in December. The replies have been placed at the disposal of the Station Veterinarian, and they give emphasis to the statements of the swine breeders, pure water and cleanliness and care being the means of warding off the disease. Special stress was placed upon the source of the water supply and how delivered to the hogs. *Fifty per cent. of those that made reply used surface water, as ponds, creeks, ditches, or permitted an overflow from springs or wells that formed wallows.* Seventy per cent. had hog cholera. If the germs find stagnant or surface water, a fertile soil in which to multiply, the results are as might be expected. Those that escaped handled their hogs in essentially the same manner as given by the swine breeders in the table.

Recently there has been a strong sentiment developed for specific legislation upon the disease. The present laws are sufficient to accomplish great good if enforced. The law relative to the disposition of the carcasses, if carried out, would materially reduce the source of the infection. Section 22 under the act creating the Live Stock Sanitary Commissioner fully empowers the commission with the right to regulate the transportation of stock on all lines in the State and in all stock yards connected with them. If the railroads spread the infection, disinfection of the car can be required.

SPECIAL NOTICE.

The Experiment Station desires the co-operation of swine raisers in the study of this disease. We solicit the experience of many in determining the length of time that should elapse after the disease has been present in a pen until it is again safe to introduce new stock.

We desire to open correspondence with a large number who feel disposed to give a quarterly report of the occurrence or absence of disease in their own herds or immediate vicinity. We will supply the blanks and hope to have the co-operation of at least five hundred, and continue the work for a period of five years. Data obtained in any year is valuable, but when procured from many sources and continued for a number of years, all the elements of "chance" will be eliminated.

Address,

VETERINARY DEPARTMENT,
PURDUE EXPERIMENT STATION,
LAFAYETTE, IND.

INDIANA LAWS RELATING TO HOG CHOLERA.

The following laws are quoted from the Indiana Revised Statutes for 1894. These laws were enacted in 1867 and went into effect March 11, 1867:

"SECTION 2865 (2652). *Hog Cholera*. 1. In all cases where any hog, shoat or other domestic animal shall die of the disease commonly called 'hog cholera,' or any other disease, it shall be the duty of the owner or owners of such hog, shoat or other domestic animal, or the person or persons having the care and custody of the same, having knowledge of the fact or upon receiving notice thereof, to cause the carcass of such hog, shoat or other domestic animal, without unnecessary delay, to be burned or safely and securely buried.

"SEC. 2865 (2653). *Penalty*. 2. If any owner or owners of such hog, shoat or other domestic animal, so dying with disease, or any person or persons having the care and custody thereof, having knowledge of the fact or upon receiving notice thereof, shall fail, neglect or refuse to comply with the provisions of the preceding section, he, she or they so offending shall be guilty of a misdemeanor, and upon conviction thereof before any tribunal having cognizance of the offense, shall be fined in any sum not less than ten dollars nor more than fifty dollars."

CONDENSED REPORT OF THE ANSWERS TO THE FOREGOING QUESTIONS.

No. Coy.	No. Hogs Affected	Died, 1886	Where the Disease Occurred.	Sex	Source of the Water Supply.	Preventive Measures Used.	Remarks.
1	250 to 500		Adjoining farms.	90% Heavy	Well.	Camp's Powders, small bunches	
2	175 to 175		Ten rods	Heavy	Running stream.	Care and pure water.	Carried from his neighbor.
3	100 to 100	37	None in the country		Creek water.	None.	
4	75 to 80		Adjoining farm	Heavy	Well.	Disinfectants	
5	50 to 75	54	Seven miles	Heavy	Well.	Salt, ashes, soda, charcoal	
6	75 to 100		Every farm	Heavy	Well.	None.	Not known how introduced.
7	200 to 200	75	Every farm	Heavy	Run. spring water	Salt, ashes, charcoal, etc.	Not known how introduced.
8	150 to 150	83	One mile	Heavy	Well.	None.	
9	150 to 150		One-half mile	50%	Well.	Care in feeding. Lybrand's Com.	
10	25 to 40		Under two miles	Light	Wells, cistern.	Salt, ashes, etc. Haas' Remedy	
11	80 to 100		Half mile	Heavy	Well.		
12	100 to 100		Within two miles	Light	Well.	Cleanliness, disinfectants.	
13	75 to 100		Neighbors	75%	Well.	U.S. Prescription, cleanliness.	
14	150 to 200		Forty rods		Well.	Salt, ashes, cleanliness.	
15	150 to 250	87	Neighbors	Heavy	Well.	Disinfectants, clean beds	
16	75 to 100		In neighborhood	Heavy	Well and cistern.	Cleanliness	
17	80 to 80		Adjoining farms	60%	Well.	International Stock Food, disin.	
18	100 to 150	6	On all sides	Heavy	Wells	Salt, ashes, changed feed, etc.	
19	75 to 75		On every side	Light	Wells	Purdus U.S. Prescription	
20	50 to 100		About three miles.		Well, spr., wallows	U.S. Prescription	
21	125 to 125		One mile	Light	Well and spring.	Separation, disinfectants	Brought from a sale.
22	150 to 150	25	No other hogs		Run. spring water	Sta. Yard Food	
23	100 to 100		Within a mile	Heavy	Well	Salt, ashes, etc.	
24	150 to 150		Seven miles	Light	Springs	Lime, disinfectants	
25	20 to 50	10	All around	68%	Well	Separation	
26	100 to 150	54	Three sides	85%	Well	Salt, ashes, etc., small bunches	
27	50 to 100		Quarter of a mile	45%	Well	Burn litter, ashes, charcoal, etc.	
28	60 to 80		About a mile	Light	Running water	Did not permit visitors	
29	50 to 100		Half mile	Heavy	Well water	Small bunches, salt, ashes, etc.	
30	175 to 225		Half mile	Heavy	Wells	Salt, ashes, charcoal, cleanliness	
31	20 to 40		Adjoining farms	Heavy	Wells and springs	Disinfectants, cleanliness.	
32	100 to 100		None in neighborhood		Wells	None	
33	100 to 100		About six miles	Heavy	Wells	Cleanliness	
34	125 to 150		About two miles.	Heavy	Wells	Care in feeding	
35	30 to 75		Forty rods	Heavy	Well	Salt, ashes, No special preventive	
36	100 to 140		None in the vicinity		Springs	Care in feeding	
37	40 to 50		Two miles	50%	Wells and springs		

CONDENSED REPORT OF THE ANSWERS—Continued.

No. Cont.	No. Hogs Raised Annually.	Died, 1895.	WHERE THE DISEASE OCCURRED.	Loss.	SOURCE OF THE WATER SUPPLY.	PREVENTIVE MEASURES USED.	REMARKS.
38	50 to 60		Three miles	Very heavy	Well	Pure water	
39	200 to 200		Half mile	Heavy	Wells	Lybrand's Hog R. Salt, ashes, etc.	
40	70 to 140		Adjoining farms on 3 sides	Heavy	Well	Clean feeding place	
41	150 to 150		Adjoining farms	Heavy	Springs, branch	Cleanliness. Burn litter	
42	100 to 150		Two miles all around	Heavy	Wells	Quarantine against visitors	
43	75 to 100		Five miles		Wells, spring	Small herds	
44	200 to 400		None in immediate vicinity		Wells	None	
45	50 to 75		Five miles	Heavy	Wells	Pure water, salt, ashes, etc.	
46	200 to 250		Four miles	Heavy	Well	Pure water, salt, ashes, etc.	
47	50 to 50		Half-mile		Well	Salt ashes, disinfectants	
48	200 to 200		All around.	Heavy	Wells, springs, etc.	Cleanliness, vermicide	
49	50 to 50		One-fourth mile	Heavy	Wells	Pure water, clean feed place	
50	80 to 80		None close.		Spring	Burn litter. Good care	
51	250 to 250		None close.		Wells	Disinfectants	
52	100 to 100		One mile.	Heavy	Well	None but separation	Not known how introduced.
53	20 to 80	6	All around.	Heavy	Running water	Clean quarters	Not known how introduced.
54	100 to 100	36	Four miles.	Heavy	Wells	Care in feeding, cleanliness.	
55	100 to 150		All around.	Heavy	Running water	Cleanliness and separation	
56	150 to 150		Two miles	Heavy	Wells	Cleanliness, charcoal, wood ashes	
57	200 to 200	40	All around.	Heavy	Wells	Charcoal, acid, disinfectants.	
58	150 to 225		One-fourth mile	Heavy	Well	Salt ashes, charcoal	
59	50 to 75	40	On adjoining farms	Heavy	Wells	Care in feeding salt ashes, etc.	
60	75 to 100	60	All around.	Heavy	Spring	Care in feeding	
61	75 to 100	13	Neighbors	Light	Wells and springs	Buffington Powders	
62	100 to 125	6	Neighbors	Light	Well	Toilet	
63	60 to 114		Neighbor.	Light	Well	Care in selecting feeds	
64	200 to 210		Half mile	Light	Well	Pure water.	
65	75 to 100		Three miles	Heavy	Well	Quarantine	
66	75 to 100		Adjoining farms.	Heavy	Wells and pond	Cleaning and disinfectants	
67	100 to 100		One and a half miles	Heavy	Wells	Perdue-U. S. Prescription	
68	100 to 100		Three miles	Light	Wells	Care	
69	100 to 100		Adjoining farms.	Light	Wells and springs		
70	150 to 150		In the neighborhood.	30%	Wells and spring		
71	150 to 150	20	Adjoining farms.	Heavy	Wells		Not known how introduced.
72	100 to 100		Half-mile	Heavy	Well water.		
73	125 to 140	16	Only man in the neighborhood	Heavy	Well water.		By bringing a hog to breed.

74	50 to 75	Half-mile	Heavy	Wells	Clean ranges, disinfectants	By escaping and sett'g on high-way where cholera had been. Not known how introduced.
75	75 to 200	Adjoining farms.	90%	Wells	Cleanliness	
76	200 to 250	None in neighborhood	50%	Well and spring	Cleanliness, small bunches	
77	50 to 120	One hundred rods	Heavy	Wells	Charcoal, ashes, etc	
78	100 to 100	All around.	Heavy	Wells	Care in feeding, salt ashes, etc., U. S. Prescription	
79	40 to 60	All neighbors	Light	Wells	Lime, salt, sulphur, ashes.	
80	200 to 200	Neighbors	Light	Wells	Lime, salt, sulphur, ashes.	
81	250 to 250	Two miles	Light	Wells	U. S. formula	
82	100 to 100	Five miles	75%	Rain water.	Litter burned Cross' Antiseptic Remedy	
83	100 to 100	Adjoining farms.	Heavy	Well	Pure water, clean quarters	Not known how introduced.
84	40 to 40	Half mile	Heavy	Well	Pure water, clean quarters	
85	200 to 200	Not in immediate vicinity	Heavy	Run'g air'm water	None.	Not known how introduced.
86	30 to 60	Every farmer	Heavy	Running water	Charcoal, salt, condition powders	
87	15 to 25	Not closer than six miles	Heavy	Well	Salt, ashes	
88	200 to 200	Three fourths mile	Heavy	Wells	Cleaning and burning litter.	
89	40 to 60	Three miles	Heavy	Well	Tonic mixture; clean up litter.	
90	50 to 100	Adjoining farms.	Heavy	Well	Standard food, tonics	
91	50 to 50	Adjoining farm	Heavy	Well	Pure water, clean quarters	By purchase.
92	150 to 150	All around.	Heavy	Well and spring	Separation into small bunches.	
93	50 to 50	Adjoining farms.	Heavy	Well	Pure water, disinfectants	Do not know how introduced.
94	75 to 100	Adjoining farms	Heavy	Well	Separation.	By purchase of hogs to feed.
95	60 to 100	Neighborhood	Heavy	Well		
Total—		822	Loss heavy, 62	88 used wells or		10 do not know how introduced.
72 escaped diseases.			Loss light, 14	13 used air ac-		1 does not state.
Herds of 23 had it.				water, or permitted its use.		12 account for its introduction.

BULLETIN No. 59. VOL. VII. MARCH, 1896.

BACTERIOSIS OF CARNATIONS.

BY J. C. ARTHUR AND H. L. BOLLEY.

The disease which is treated at some length in this bulletin is quite familiar to many florists at the present time, owing to preliminary notices* of the researches herein detailed having at different times been given orally before a number of societies, and in part been published. But when the investigation was begun in 1888, and up to the time the most important conclusions had been attained and made known, no such disease had been recognized by either the scientist or the cultivator. It was so obscure that the literature of carnations previous to 1890 shows no allusion that can reasonably be construed as referring to this disease.

Anomalous as it may seem, the disease which we are now calling bacteriosis, and find to be the most abundant and ever-present of the maladies of the carnation plant, easily detected even in its earlier stages, and so common as to be to some extent almost a constant accompaniment of the plant, was not previously known to the cultivator, although it was before his eyes continually, and when at its worst caused the foliage of his plants to turn a sickly yellow, or to dry up and die, and the crop of flowers to become greatly curtailed on account of it. It is, however, much to the credit of the florist, and deeply gratifying to the investigator, that, having had his attention called to the matter, he at once became interested, and in many instances mastering all that was to be learned, modified his methods and adopted remedies that have essentially banished the disease from the best greenhouses.

Not to anticipate further, however, this introduction may be closed by saying that the study now described in full for the first time, beside making known to the botanist an interesting plant disease caused by true parasitic bacteria, has already led to results of great practical and economical importance for the florist, and may be expected to serve further good ends when better and more fully known.

GENERAL DESCRIPTION OF THE DISEASE.—Bacteriosis is a disease of the carnation leaf, rarely attacking the stem or other parts of the plant. It generally starts in the leaf when immature, and is best diagnosed in the younger but full-sized leaves nearest the upper end of the stem. Taking such a leaf, which on its surface presents no unusual appearance to the eye, and holding it toward a strong light, small pellucid dots may be detected scattered irregularly through the leaf, sometimes having a faint yellowish color, which are the centers of infection (see

*Arthur, J. C., Proc. Amer. Assoc. Adv. Sci., xxxviii (1889), p. 280; (name erroneously printed "Harter") "Amer. Florist," vi (1891), p. 419; Rep. Amer. Carn. Soc. 1892, p. 52; Rep. Amer. Carn. Soc. 1894, p. 12; "American Florist," ix (1894), p. 647.

See also Halsted, B. D., "Amer. Florist," viii (1893), p. 732, 2 illustrations; Rep. Amer. Carn. Soc. 1893, p. 57.

Fig. 1). The appearance of the dots has a close resemblance to those of the oil glands in the leaves of the common St. John's-wort (*Hypericum perforatum*), a rather abundant weed, or in the leaves of the false indigo (*Amorpha fruticosa*), a native shrub, except that they have no regular disposition. Sometimes the surface of the leaf is slightly raised over the dots, making watery pimples.

After a time the surface of the leaf above the dots changes enough to indicate their presence, and finally shows a distinct spot. As the disease extends inside the leaf, the surface tissues dry, the internal tissues collapse, and whitish sunken spots appear. In some colored varieties of carnation the spots vary somewhat by being more or less reddish or purplish.* As the spots increase in size the leaves wither, still clinging to the stem. Such spots never show distinct central darker colored specks, and rarely any concentric circles, as do the spots made by parasitic fungi, such as *Septoria* (spot disease) and *Heterosporium* (fairy ring).

Very badly diseased plants, especially when much crowded and growing in damp atmosphere, have more yellowish green leaves than normal, of a more transparent appearance, and usually smaller. The lower leaves of diseased plants in any atmosphere or soil die prematurely, and the vitality of the plant is so lowered as to check the growth and decrease the size and number of the flowers.

HISTORY OF THE INVESTIGATION.—Before proceeding further it will be well to give some account of the course of discovery leading to the present understanding of the subject, which will among other things make clear a number of details of practical importance.

During the carnation season of 1887-8 the attention of the Station botanist was a number of times called to the abnormal deterioration of the plants, death of the leaves, failure of the flowers and general unhealthy appearance of some of the carnations grown by the University florist, Mr. Pierre Vanlandingham. This did not occur in all varieties alike, but was more conspicuous in some, especially in Buttercup. Mr. Vanlandingham considered the trouble due to some specific disease. Examination was made at different times, but no parasites, either insect or fungous, could be detected even with the most careful microscopic exploration of both surface and interior tissues of the various organs of the plant.

In fact, no cause, either parasitic or non-parasitic, could be found to account for the difficulty. The eye, either unaided, or by the assistance of the microscope, detected only a gradual shriveling of the tissues of the leaves. At first light-colored blotches made their appearance, which gradually extended, coalesced, and finally the whole leaf became dry and lifeless.

After a time these dead leaves, while still clinging to the plant, became infested with various saprophytic fungi, more especially with *Volutella* sp. and *Cladosporium herbarum*. The plants in this stage presented a quite unsightly appearance to the florist's eye, and yielded few good flowers.

In January, 1889, an article by Mr. A. B. Seymour on the fungus, *Septoria Dianthi*, as a cause of carnation disease, appeared in the "American Florist" and in again searching the plants in the University greenhouses (the Station not yet

*An obscure disease of carnations known as "purple joint" is not, so far as the authors know, in any way connected with bacteriosis.

possessing any glass structures) for the possible occurrence of this malady, attention was first attracted to the semi-transparent dots in the green and unblotched leaves, already described. Repeated microscopic examinations of the sections through these spots convinced us that the cells of the region were always infested with bacteria, often in considerable numbers. It was not difficult to see that the conspicuous dry blotches might be derived from the inconspicuous dots, and that the latter possibly represented the beginnings of a genuine disease. There were now a number of difficult questions to answer, foremost of which was to show the causal or accidental relation of the bacteria seen in the cells to the degeneration of the tissues. The larger part of the work of the investigation from this time on until the main facts were established, a period of about eighteen months, fell to the lot of Mr. Bolley.

SEPARATION OF THE SPECIFIC GERM.—This proved to be a matter of considerable difficulty. Repeated trials for a number of months gave such varying results that nothing of a substantial nature was learned. Saprophytic forms from the air and from the leaves of the plant took possession of the cultures, obscuring or destroying the slower growing parasitic form. It was not until it occurred to us to acidify the culture media, in imitation of the acid plant juices that the difficulties began to vanish. Malic acid was used; and the cultures were no longer crowded with extraneous forms, the saprophytic bacteria especially making little or no growth.

Thus we are enabled to separate a germ, very characteristic in growth and appearance, which eventually proved to be the specific bearer of the disease.

INFECTION EXPERIMENTS.—At the same time that attempts were being made to separate a specific germ, various infection and inoculation tests were conducted. The contagium for these was for some time obtained by cutting up diseased leaves into nutrient fluid, at first of neutral and afterward acid reaction, and using the germ laden liquid, after permitting a day or two to intervene in which the bacteria might multiply.

The first successful transfer of the disease was made in March, 1889. On March 26 the interior tissues of a diseased leaf were cut out with a sterilized knife and dropped into potato infusion. On March 28 the infusion had become cloudy from the growth of bacteria, and a thin pellicle had formed. Application of the liquid was now made with a camel's hair brush to the surface of four young leaves of a small healthy carnation plant growing in the greenhouse. Indications of a change in the infected regions could be detected on April 12, and distinct characteristic dots where the infusion was applied were clearly seen on April 16, the remainder of the plant remaining quite free of any such appearance. (See Fig. 2.)

Another plant was similarly treated with the same material on March 30, but with the added precaution to cover the plant with an open topped belljar, plugged with cotton to guard against accidental infection or interference. Distinct evidences of the disease appeared on April 16. It was thus shown that the disease could be artificially transferred from one plant to another.

No pure cultures were yet available, and for various reasons, chiefly the lack of suitable plants and special appliances, the work was almost discontinued until fall.

In September, 1889, the work was again taken up, a greenhouse having been built in the meantime, and vigorously prosecuted. Numerous cultures were made from diseased leaves of the carnation, using both liquid and solid media. The liquid media were chiefly infusions of corn sprouts and of potato, mostly the latter, and the solid media were nutrient gelatin and agar-agar, variously prepared.

One of the most constant sorts obtained in the trials was a coccus-like form of a yellowish color, that grew slowly, but developed well in acid cultures. It was looked upon as the probable cause of the disease as early as October of this year, and was studied in various ways. Many surface infections were tried in the manner already described, but the purity of the cultures could not always be guaranteed, or else the trial plants developed diseased spots outside the inoculated area, and thus absolute certainty could not be attained.

January 15, 1890, an infection of three seedling carnations in the greenhouse, two protected with belljars and one uncovered, was made as previously described, using a potato infusion. This infusion had been infected the day before with the yellow coccus-like germs from a pure culture on solid media, which had originally been obtained from diseased carnation leaves on November 18, 1889. The affected areas began to show disease in six days, and in eleven days more all the leaves became "infected at the points of application, and at these points only," as stated in the record book, and remained so for a month and a half, or more (Fig. 1). It was now believed that the germ causing the bacteriosis was found, and although many subsequent infection experiments were carried out with varying success, the remainder of the winter was chiefly given up to the biological study of the specific germ.

The best method for applying the contagium was, for a time, uncertain. The method used in studying pear blight, the well-investigated bacterial disease of pomaceous trees, which consists in abrading the surface so that the germs may at once come in contact with the internal juices and tender tissues of the plant, proved inapplicable to the carnation disease. No clearly marked cases of the disease were obtained in this way. The wounds showed in some cases a slightly yellowish margin, but otherwise gave few indications of results differing from those which might arise from any accidental abrasions.

Surface application, wetting the uninjured surfaces of the young leaves with the germladen fluid, was finally adopted as the proper method of infection.

Experience showed that success could only rarely be attained when the infectious fluid was applied to mature leaves. The best results were always secured when the application was made to the small appressed leaves at the end of the stem. They were drawn back and well wet with the fluid, and, if growing vigorously, usually showed the characteristic pellucid dots by the time the leaves were full size.

A difficulty was experienced in securing perfectly healthy plants, for it was found that nearly all carnation plants, whether grown in the greenhouse or out of

doors, in pots or in beds, showed more or less evident traces of the disease, when examined critically.

DESCRIPTION OF THE GERM.—The microbes, as they appear in the cells of the host, are oval or elliptical in outline, not united into chains or filaments, but almost or quite separate from one another, and about one and one-half times as long as broad (Figs. 11 and 20). They are of medium size ($.9-1.25 \times 1-2\mu$), being neither among the largest nor the smallest of bacteria. Within the tissues of the host they do not exhibit independent movement, and undergo no marked variations in form during growth.

When transferred to richly nutritive media, which are sufficiently moist, they undergo rapid division, often forming filaments of considerable length ($15-300\mu$), are highly motile, and finally pass into a zoogloea state of rest (Figs. 12 and 15). In old cultures on solid media they present about the same individual appearance as in living tissues of the carnation (Fig. 11).

In mass these bacteria have a yellow color, which is more strongly developed in presence of free acid. The color accumulates slowly as the bacteria grow (Figs. 3 to 5), and is apparently not deposited within the cell, but is an excretion from it.

No spores have been found in any stage of development, or under any conditions of growth, and it appears to be strictly an arthrosporus form.

Although it grows readily in artificial cultures, it has only been found in nature in leaves of the carnation pink (a horticultural form of *Dianthus Caryophyllus*). Infection experiments have shown that it can be transferred to the clove pink (*D. Caryophyllus*), Pheasant's-eye pink (*D. plumarius*), Japan pink (*D. Japonicus*), Indian pink (*D. Chinensis*), and Sweet William (*D. barbatus*), but not to the shoots, leaves or tubers of potato, or to other non-caryophyllaceous plants.

From these facts it is concluded that the germ of the disease is parasitic only upon pinks, and is a new and undescribed form. It is, therefore, proposed to name it *Bacterium Dianthi*.*

ISOLATION OF THE GERM.—Plate cultures of nutrient acid gelatin were used for this purpose. The gelatin may be made so strongly acid that, so far as we are aware, no atmospheric or ordinary saprophytic forms will materially interfere with the development of the germ. Malic acid was used, but doubtless other kinds will accomplish the same purpose.

A number of ways for transferring the germs from the leaf to the gelatin were tried, all more or less uncertain. The chief difficulty was due to the simultaneous transference of other germs which occur on the surface of the leaf, or drop in from the air, and which grow so much faster in the cultures as to overrun the plates before the form sought can be seen. As just stated, acidifying the medium is a partial and serviceable corrective.

In all cases it is best to select leaves in which the disease shows as small dots when examined by transmitted light, but gives no surface evidence of its presence.

* *Bacterium Dianthi* Arth. and Boll. n. sp.—Cells oval to elliptical, single or rarely united, $.9-1.25 \times 1-2. \mu$: in rich fluid media more united, in part forming short filaments, at first motile, afterward forming distinct elongated, somewhat convoluted zoogloea; on solid media becoming yellow in mass.

Habitat: Mesophyll cells in the leaves of carnation pink.

In such leaves, the younger the better, the disease is not so far advanced as to cause breaking down of the tissues, which would give a footing for other confusing forms of bacteria.

At first the outer surface of the leaf selected was removed with a flamed knife, and the inner portion cut up and dropped into the nutrient medium. Although the leaf is somewhat fleshy, yet it is too small, and the infected spots are too minute and too near the surface to make this a convenient method.

Attempts to free the surface of the leaf from other germs by washing with corrosive sublimate (one pro mille solution of bichloride of mercury) always gave negative results. Some of the poison passed over into the culture and prevented growth, even when the leaf was well washed with distilled water after its treatment with the corrosive sublimate.

Most of the work was done with cultures obtained by passing the leaf quickly through a Bunsen gas flame two or three times, thus destroying all surface molds and bacteria, in both spore and vegetative condition, and then cutting the leaf into thin sections with flamed scissors, allowing the sections to drop into the nutrient medium.

Either the fragments of diseased leaf were put directly into liquefied gelatin, which was shaken and then spread out over a glass plate, or more frequently they were dropped into a vegetable bouillon, and after a day or two a minute quantity of the germ-filled bouillon was transferred to liquefied gelatin and then to a plate. In either case the colonies which shortly appeared upon the plate were transferred to test tubes and pure cultures thus obtained.

PLATE CULTURES OF THE GERM—The method of preparation is to inoculate a tube of 10% acid, nutrient gelatin, made liquid by warming. The inoculation is performed by inserting a germ-laden platinum needle into the gelatin, the germs having been secured by dipping the needle into a liquid (or solid) culture of the germ. The tube is then shaken up and flowed evenly over sterilized plates (or Petri dishes may be used) which are kept in a moist chamber in a cool place, so that the gelatin readily sets in a thin film over the glass. Dilution methods may be introduced if deemed necessary.

If the work has been well done so that the bacteria were thoroughly separated before the gelatin was poured over the plate, each individual germ, beginning to multiply very rapidly, forms in the space of two or three days numerous separate specks in the nutrient gelatin, each representing a colony which has arisen by multiplication from the scattered individuals in the culture. The appearance of the colonies of *Bacterium Dionthi* is quite characteristic; and if other bacteria grow upon the plate, microscopic characters permit of discrimination to a considerable degree, as a rule.

In neutral plate cultures of *Bacterium Dianthi* the colonies after a time usually consist of a few light-colored zooglæa bodies with a surrounding irregular area of actively growing bacteria, the whole having a light cream color (Fig. 13). These colonies spread irregular, and coalescing, form what appear to the unaided eye as comparatively large viscid drops.

In acid plate cultures the zooglæa make up nearly the entire body of the colony, giving a more irregular outline and a lobed and wrinkled appearance to the

surface (Fig. 14). The color is a light clear orange. When growth is strong the colonies pile up into pronounced yellow viscid drops.

TEST TUBE CULTURES WITH SOLID MEDIA.—Streak cultures on gelatin*, made by dragging a germ-laden needle along the surface of the medium, at first show a smooth, even growth along the track of the needle, and a pale cream color. At this stage the bacteria are very motile and are in the most active period of division (Fig. 3). After a few days little viscous elevations gather at various points along the margins and over the surface, giving the culture a somewhat mottled appearance, while the color deepens to a bright orange, especially along the middle line (Fig. 4), the color being much deeper in acid cultures.

The germs possess an activity which causes individual bacteria to penetrate the gelatin, and to become the centers of colonies at various depths below the surface. This gives a peculiar feathered appearance, the dots seeming to radiate from the needle track (Fig. 5). Acid cultures, being more favorable to growth, are also more favorable to this feathering. The solidity of the medium, however, exercises the chief control. With 90% or more of water the bacteria penetrate the medium readily, but with 85% or less there is little or no penetration.

Liquefaction of the gelatin takes place slowly, not becoming noticeable until eight or ten days in room temperature. Complete liquefaction will eventually take place.

Stab cultures, made by thrusting a germ-laden needle into the middle of a tube of nutrient gelatin, show but little growth or color along the track of the needle, but an abundant feathering of the germs in all directions. There is no accumulation of gas, and probably none is formed.

On agar-agar† the appearance of the cultures is not materially different from that on gelatin, except that the germs do not penetrate the medium, and no feathering takes place. The granulation of the surface of the culture is usually less pronounced, and, as would be expected, no liquefaction occurs.

On slices of cooked potato the growth is abundant, and similar to that on agar-agar.

TEST TUBE CULTURES WITH LIQUID MEDIA.—The liquid media used in these studies were infusions of corn (maize) seedlings‡ and of potato tubers.¶ In either

*Gelatin medium is made by using 1500 cc. water in which 1½ lbs. of minced fresh meat have soaked for a day, adding 100 g. gelatin, 3 to 5 g. table salt, 10–12 g. pepsin, and heating (preferably in steam sterilizer) until the gelatin is fully liquefied. Neutralize with sodium carbonate, or acidulate with malic acid, as neutral or acid media may be desired. If neither is done the culture material will be slightly acid. Finally clarify with white of egg.

†The culture medium is made in essentially the same way as the gelatin medium, except that 15 g. of agar-agar are substituted for the 100 g. of gelatin.

‡To make corn infusion, cut up finely a quantity of corn seedlings, germinated between folds of moist cotton, having the shoots an inch or two long, and boil for a while in water, or until the liquid becomes red. Cool and add some pepsin, boil again, and finally filter. It will be slightly acid. If wanted neutral or more strongly acid, it should be made so before the last boiling. This makes a very transparent liquid, free from sediment, although usually highly colored.

¶To make potato infusion, slice some pared potatoes into enough water to fully cover them, and heat without boiling for some hours. Pour off the liquid, partly cool, add white

of these media, especially when slightly acid, the germs make a luxuriant growth. The liquid becomes turbid after some hours, due to the rapid multiplication of the bacteria, and in one or two days a pellicle forms over the surface. The pellicle has a granular or finely mottled appearance. Both the pellicle and the turbid mass beneath are at first whitish, becoming pale-cream color with age.

Imbedded in the pellicle and floating free in the liquid are zoöglœa bodies in great abundance. In about two weeks the pellicle begins to disintegrate, and a precipitate gathers at the bottom of the tube.

DROP CULTURES UNDER THE MICROSCOPE.—By growing the bacteria in a drop of nutrient fluid in a moist chamber upon a microscope slide the continuous observation of the growth and development of the germs is made possible. In such a preparation the changes of form due to growth, all stages of division in the production of new individuals, and the formation and final disintegration of zoöglœa may be readily traced.

It is in this way that the filaments occurring in fluid cultures undergoing rapid growth are seen to arise from multiplying bacteria, in which the new cells tardily separate from one another. Such filaments display more or less indication of constrictions and cross walls here and there (Fig. 12c), and readily fall apart when the liquid is agitated.

Individuals in very rapid growth are normally motile. The movement is like that of a flagellated organism, but no cilia have been seen. Whether they occur or not can not be stated, as no careful examination for them has been attempted. Motile cells (Fig. 12a) exist, not only singly, but even more commonly in pairs; and often two or more pairs may remain united until the filament becomes too unwieldy for movement. The parts of a filament, and especially two pairs of cells, may be held together by a kind of flexible joint, which suggests the presence of a connecting flagellum, as known in other species of bacteria.

The production of zoöglœa is particularly interesting. Certain individuals, without ceasing active multiplication, become non-motile, and at once begin to excrete a gelatinous envelope (Fig. 12b). This envelope offers considerable resistance to longitudinal extension, and the new cells as they form slip past one another, accumulating in an elongated mass, which increases faster in thickness than in length (Fig. 12d). The mechanical resistance offered by the gelatinous envelope has undoubtedly much to do with the rounded, lobulated outline of mature zoöglœa (Fig. 15). If the nutrient fluid is not renewed, the zoöglœa disintegrate in ten to fifteen days by liquefaction of the gelatinous envelope, permitting the bacteria to fall to the bottom of the fluid as independent inert cells.

The rate of multiplication also can be determined in a hanging drop, as it is possible to continuously observe the same individual for some time. Two individuals were thus watched through a full generation, and two others for a somewhat

of egg, heat again for an hour in steam sterilizer, and, after thoroughly settling, again decant the liquid. Add a small amount of malic acid and some pepsin, heat in steam sterilizer one-half hour, then filter. To obtain a neutral solution, neutralize and heat again just before the last filtering. This process should give a perfectly transparent and colorless liquid, which will remain free from sediment.

longer period (Figs. 6, 7, 8, 9 and 10), the temperature being about 35° C. It was found that a bacterium of the typical form (Fig. 6, 2 and 4) showed a well-marked constriction, or even a cross wall, within seven minutes (Fig. 7, 2' and 4'), and in twenty minutes more there were two full-grown bacteria formed from each original cell (Fig. 8, 2'' and 4''), although still attached to each other. Each of these cells may divide, and a chain of four cells result (Fig. 9, 4'''), or the cells may separate and the process be repeated (Figs. 6, 7, 8, 9 and 10, 3).

We may conclude from these observations that under good conditions for growth an individual of *Bacterium Dianthi* may become two within a half hour, and these two increase to four in the second half hour and so on. At this rate there would be sixteen at the end of two hours, sixty-four at the end of three hours, 256 at the end of four hours, over sixteen millions at the end of twelve hours, and over 280 billions at the end of one day. Is it any wonder that a few germs placed in a test tube culture will make it turbid within twenty-four hours? Although the individual bacteria are very minute, requiring over 1500 of them placed side by side to extend the sixteenth of an inch, yet the 280 billions that may be formed from one germ within a day represent no insignificant bulk. They would in fact occupy fully a cubic inch of space. As it takes the material of three or four fluid cultures to fill a cubic inch, it is evident that even under the favorable condition of artificial cultivation the food supply soon becomes inadequate to keep up a maximum rate of growth.

ACTION OF GASES WITH VARYING TENSION.—To secure pressure a fresh test tube culture on neutral agar-agar was attached directly to a small gas generator (Kipp's pattern), remaining connected under a pressure of about 25 cm. of water for five days.

In carbon dioxide under pressure a very slight growth occurred without coloration, and the original inoculated germs lost what color they first possessed. The slight growth may be assumed to be due to a small amount of oxygen remaining in the agar-agar substratum, which could not be readily displaced by the method pursued.

In hydrogen under pressure the growth was almost normal in amount but with very faint coloration.

In atmospheric air under pressure the growth was to all appearance normal in both amount and color.

A partial vacuum was secured by first partially drawing out the upper portion of the tube containing the culture, by holding over a flame, then attaching the tube to a water pump. When the exhaustion was carried as far as possible, the constriction and sealing of the tube was completed in a flame.

Cultures on neutral agar-agar were sealed when the vacuum pump registered 730 mm., the barometer standing at 742 mm. In the first twenty-four hours a slight growth occurred, due, it may be supposed, to the small amount of air still confined in the tube, both without and within the substratum. No further change took place. After twenty-five days air was admitted to the tubes, and a normal growth at once sprung up, with the usual coloration.

It is apparent from these tests that *Bacterium Dianthi* is an aerobic germ, requiring free oxygen for its development, and that the development of color also depends upon the presence of free oxygen.

EFFECTS OF TEMPERATURE UPON GROWTH.—The range of temperature for the activity of the germs is very wide. They make comparatively rapid growth at 8–16° C., which is the temperature of the chamber of the refrigerator used in the laboratory. It is therefore presumable that it would take a very much lower temperature to stop their growth, and that they might even be subjected to freezing without permanent injury, as is the case with many species of bacteria.

The upper ranges of temperature were more carefully tested. A drop culture was used, and the time required for a cell to divide and become two was taken as an index of the effect of the heat. To secure a uniform temperature the microscope with the culture slide in place was put inside a Pfeiffer warm chamber, which was provided with a thermo-regulator, and otherwise arranged to give perfect control of the heat. It was found that the rate of division increased up to 34–36° C. (93–97° F.), but as the temperature rose above this point the division was less rapid. The highest temperature used was 45° C. (113° F.), which still gave a fair rate of growth and cell division, showing that the point at which growth would entirely cease must be relatively high.

STAINING THE GERMS.—In regard to this mode of study and differentiation nothing of characteristic value was noted other than that in all stages of its development the bacterium stains readily with most of the dyes in general use, the ones most successfully used being aqueous solution of fuchsin and of gentian-violet.

THE GERM AS A PARASITE.—Sections through diseased carnation leaves in the earlier stages of bacteriosis reveal the individual bacteria for the most part imbedded in the protoplasm, with only a few here and there in the cell sap occupying the vacuoles. There are often a score or two in each cell, but they are rarely numerous enough, even in the later stages of the disease, to form the chief part of the cell contents.

The first marked disturbance in the cell is the gradual disorganization of the chlorophyll granules. This is followed by the breaking up of the protoplasmic utricle, and the general disintegration of the whole cell contents. The osmotic action of the cell is early interfered with, at first making the diseased tissue more transparent, and afterward permitting it to dry out and collapse, forming dead spots in the leaf.

The bacteria progress from cell to cell very slowly, and each diseased area is long kept within narrow and well circumscribed limits. The danger from the germ as a parasite lies rather in the great number of chances for centers of infection than in its aggressive character.

That the conditions of its life within the carnation plant are not the best for its highest development is evident enough. In the first place there is no apparent movement; and the evidence of direct observation would mislead one into believing it to be a non-motile organism. But there must in reality be a slow movement of some sort, as it has the power to travel from cell to cell. It may be assumed that it has independent motion within the plant, in kind like that which is so

conspicuous a feature of its development under artificial conditions, but so reduced as to be too slow to be detected by the usual methods of microscopic observation.

Again, it is noticeable that in the plant the cells are rarely united, even in pairs, and never in filaments. Their form and appearance is that of growth in old artificial cultures, from which the nutriment has been largely extracted (compare Figs. 11, 12 and 20).

We may therefore safely conclude that although *Bacterium Dianthi* is a genuine parasite, inhabiting only members of the pink family, as infection experiments already referred to indicate, yet it can also exist outside of living plants, probably in natural infusions of decomposing vegetation. Hence it may be considered a facultative saprophyte.

MODE OF PENETRATING CELL WALLS.—How parasitic bacteria make their way from one cell to another is a question of some interest. It is difficult or impossible to find perforations in the cell wall through which they might have passed; and yet they can be found in the interior tissues, imbedded in the cell contents, and no theory can fully account for their presence except the one that they have perforated and passed bodily through the wall.

The matter attracted the attention of the first person who carefully studied a bacterial disease of plants. Burrill* in his account of pear blight says, "Unless the bacterium does dissolve for itself a passageway through the cell wall, it can not possibly gain entrance in the adult state, yet they are found swarming in cells absolutely closed so far as a power of one thousand diameters can reveal." His speculations left the subject without indicating with any certainty the direction in which the solution of the problem lay.

At the present time we feel certain that the organism does "dissolve for itself a passageway," even if the opening can not afterward be detected. It was shown by Marshall Ward† in 1883 that parasitic fungi excrete an enzym, by which they dissolve the cell wall against which the ends of the hyphæ press. Since then numerous investigations have demonstrated the excretion of enzymes by different bacteria as well as fungi, and we can not doubt that it is in this manner that the bacteria of pear blight and carnation bacteriosis make their way from cell to cell.

Although under ordinary circumstances no openings can be found in the wall to show where the bacteria passed through, yet this is not always true. The disease as seen in the Japan pink through artificial infection, as well as in the other varieties having thin yellow-green leaves, exhibited many instances of the corrosion of the walls by the bacteria. The cell walls of such pinks are much thinner and more delicate than in the varieties with narrow, fleshy, pea-green leaves, and are more readily affected by the parasite. When the tissues are heavily infested with the germs, openings of considerable size may often be seen in the walls, apparently due to the cumulative erosive action of the bacteria (Fig. 20). In some instances the germs are found appressed to the wall, which is visibly eroded in places, so that the parasite may be sunken half its depth into the wall,

*"Anthrax of fruit trees," Proc. A. A. A. S., xxix (1880), p. 594; "Blight of pear and apple trees," Trans. Ill. Univ., 1880, pp. 74-75.

†"A Lily Disease," "Annals of Botany," ii (1888), pp. 337-356.

the complete perforation being only a question of time. There is an evident connection between the ready solubility of the walls and the virulence of the disease in these several varieties of pinks.

In those cases in which bacteria are found in the cells and no entrance visible, we may believe that they have dissolved a passage through the wall by action of an enzym, and that the perforation is either quickly healed by growth and swelling of the wall, or that it is veiled by the layer of protoplasm lining the cell, of which alternatives the first is much the more probable.

ENTRANCE OF GERMS INTO THE HOST.—Our study of the disease gives no evidence that the germs are able to effect an entrance through the cuticle of the host by means of an enzymic perforation. On the contrary, they are dependent upon either natural openings (stomata) or accidental punctures (insect stings) to get inside the plant.

The stomata (breathing pores) are the usual points of attack. Germs of the disease which have been deposited upon the surface of the host by wind or rain find their way through the opening between the guard cells into the air chamber beneath. Here they attach themselves to the walls of the surrounding parenchyma cells, and, dissolving a passage, gain entrance to the living tissues of the leaf (Figs. 19 and 20). In artificial infection, using a large number of vigorous germs, it was found that with thin-leaved pinks, not only the cellulose walls of the inner tissues, but the cuticularized outer walls of the epidermis, were often broken down, apparently the attack coming from within (Fig. 20 c, c). However, this very rarely, or never, occurs in the fleshy-leaved varieties, and, in any case, would be especially rare under natural conditions.

It is evident that after the bacteria fall upon the leaf, sufficient moisture must be present so that they may move about and find their way into the cavities of the stomata. A natural dew or artificial sprinkling will furnish the needed moisture. And so it is that plants in a greenhouse, where the air is kept moisture-laden, will show most disease.

In both natural and artificial infection the earliest indication of the disease is the appearance of translucent dots, which are found by microscopic examination to be always underneath the stomata. These dots are scattered over the leaf (Figs. 1, 2 and 17), and are round until they coalesce with adjoining dots, and thus form dots or areas of irregular outline (Fig. 18). It may be inferred from this that natural infection is usually through the stomatal openings.

It was early found that it is difficult to introduce the disease into mature leaves, but that it readily attacks young and partly-grown leaves. From what has been stated it is not difficult to give an explanation of this apparent preference. The cellulose walls of the stomatal air cavities are easily penetrated in young leaves, but in mature leaves they have become incrustated with lime salts deposited from the evaporating water, and are also somewhat changed chemically, making them less susceptible to the action of enzym, and consequently almost impervious to the bacteria.

The question might be asked why other species of bacteria do not gain entrance to the tissues in this manner also, for it is a fact that the surface of the carnation leaf, and practically of all foliage, is infested with numbers of bacteria, and often

of yeasts. In fact, in studying the disease, one of the most troublesome intruders into the cultures was *Bacillus subtilis*, commonly called hay bacteria, which seemed to be a constant inhabitant of the leaf surface. Other species appeared less regularly. The first reason for immunity against these surface and other bacteria is doubtless the acid reaction of the plant juices, for we have seen that, in artificial cultures, acidifying the medium hindered or prevented the growth of other forms. The bacteria which find their way into the stomatal chambers, therefore, develop no further on account of the acid sap. The resistance of the living protoplasm is doubtless another strong factor, preventing most germs from making any advances, even after gaining an entrance to the interior of the cell. And it may be that the secretion of a proper enzym is lacking, although on this point we have no evidence.

When the disease has progressed sufficiently to kill the cells, saprophytic bacteria, and even fungi, are not slow to take possession and complete the work of destruction (Fig. 19). This accounts for the fact that the lower leaves of a diseased plant often rot or mold far worse than of a healthy plant under same conditions.

Besides gaining entrance to the plant through natural openings, the germs of bacteriosis may enter through insect punctures. The only insects that require attention in this connection are plant lice (aphides). The common green fly, or aphis, of the greenhouse may, in some instances, prove such an efficient bearer of the contagion that every leaf on a plant may be inoculated at hundreds of points, and the whole plant be turned a sickly yellow by the growth of the bacteria in the tissues. It is evident that only in a neglected greenhouse will the disease be seriously spread by this means, for only in such would the aphis be allowed to flourish.

VARIETIES OF CARNATION AFFECTED.—No varieties of the carnation are exempt from the disease, but they differ much in susceptibility. The seat of this difference is chiefly in the vigor of the plant. Weakly varieties, like Buttercup, Sunrise and La Purité, are most affected, while seedlings are least affected. Poorly grown plants are more affected than those well grown. Partly starved or stunted plants are specially liable to attack. It must be remembered in this connection, however, that plants of any degree of vigor may be essentially free from the disease because the foliage is kept dry, so that the germs can not pass from the surface into the stomata, and aphides are absent. Susceptibility can only be shown where the conditions for the spread of the disease are present. But, on the other hand, if the conditions are particularly favorable to the disease, any plant, however vigorous, may succumb.

DISTRIBUTION OF THE DISEASE.—It is not at present possible to state the extent to which the disease is distributed, owing to the fact that florists have not yet become sufficiently familiar with it as a distinct disease, and so there are no published data. The writers have seen it in greenhouses at the following localities, or have seen cuttings from the places, showing the disease: Indianapolis, Lafayette, and many other places in Indiana; Buffalo, Boston, New York, Toronto (Can.), Chicago, and Lincoln (Neb.). From the examination of much material, and from the appearance of the disease in the several localities where personal examination was made, it is safe to say that it is common throughout Eastern North America, and furthermore the indications are that no locality in this wide region, where any

considerable number of carnation plants are grown, is entirely free from it. One may say that a marked characteristic of the disease is its universality.

ECONOMIC ASPECT OF THE DISEASE.—The bearing upon carnation culture from the commercial standpoint is a matter of moment. It needs no argument to demonstrate that any considerable attack of parasitic bacteria, as in the case of any other form of parasite, will weaken the plant and lessen the harvest which the plant would naturally yield, and, carried to the extreme, will render the plant worthless or even kill it.

It is in accordance with the writers' observations that, while bacteriosis of carnations rarely kills a plant, it does frequently reduce the strength of the plant to a degree decidedly unprofitable to the florist. Even when casual observation sees nothing wrong with the plants, there may be enough disease present in the foliage to decidedly lessen the yield of flowers or to injure the growth of cuttings.

The grower of cut flowers especially must guard against the inroads of this disease, if he would have the fullest returns in the way of both quantity and quality of bloom. It is the insidious nature of the disease which makes it so especially formidable. It establishes itself among the florist's plants, flourishes and takes full possession of the bench without being detected. The result is that the flowers do not reach their maximum size and are far less in number than the variety, soil and culture would warrant. Thus the legitimate profits of the business are reduced.

Mr. Fred. Dorner, well known for his eminent success in growing fine carnations, said in a recent paper before the Society of American Florists* that "of all diseases [of the carnation] the bacteria and rust are the two most prevalent and most dangerous on account of the epidemic nature of the former and the widespread dissemination of the latter." He gives at considerable length the conditions under which he has observed the bacteriosis to flourish. "We mostly find some sporadic cases in every establishment," he says, "telling us of their presence, and when these warnings are neglected they may become epidemic."

There can be no full return of profit in plant culture without healthy foliage. To let the lower leaves of the carnation plants die, when they might as well be alive and nourishing the plant, is for the commercial florist to throw away a part of his available income, and is very impolitic for the amateur. The uncontrolled presence of the disease will lead to this. To permit the disease to have any hold whatever upon the plants, such as might be readily avoided, is a voluntary relinquishment of a portion of one's legitimate profits where the carnation is grown for commercial purposes.

METHODS FOR CONTROLLING THE DISEASE.—The knowledge that has been gained by studying the cause and the nature of bacteriosis makes clear a rational means of controlling it. As soon as the way in which the germs found entrance into the plant was discovered a method of keeping them out presented itself.

As there must be moisture upon the leaves sufficient to enable the bacteria to move about and enter the stomata, in order that they may gain access to the interior of the leaf, it is evident that keeping the foliage dry will prevent the disease.

* "American Florist," xi (1895), p. 87.

Putting this inference to a practical test proves it to be well founded. In applying the preventive upon a commercial scale difficulties are at once encountered, chief of which are the advent of the red spider when the foliage is kept dry and the inconvenience of keeping the soil wet without wetting the foliage. But these difficulties can be adjusted.

The development of a rational method of treating the carnation was hastened by the increasing interest among florists in other carnation diseases and especially in carnation rust, which first attracted attention in this country in 1891. This and other fungous diseases are much promoted by the presence of surface moisture; and a sparing use of water on the foliage is advocated in order to keep them severally in check. In the discussion which followed the reading of a paper on rust before the American Carnation Society in Buffalo, in 1892, it was apparent that a majority of the growers present believed that, if anything was to be gained by it, there would be no great difficulty in so watering a carnation house that the foliage could be kept practically dry and yet free from red spider. Although there was much diversity of opinion regarding details, yet the essential features were (1) to sprinkle from overhead at long intervals, say once a week in spring and fall, and less frequently in winter, and only on bright warm days when there would be rapid evaporation, thus giving sufficient moisture for the foliage, and (2) to wet the soil by sending a stream of water along the surface of the ground between the rows, thus watering the roots without wetting the leaves. At no time should the plants be watered overhead, or sprayed, at such a time that the foliage will remain wet over night.

An improvement upon this method would be to do all watering between the rows beneath the foliage, and to spray the foliage as much as necessity may require with a weak fungicide, such as one of the copper compounds. Bordeaux mixture may be used, or ammoniacal copper carbonate.* The latter is to be preferred, as it does not stain the foliage.

Keeping the foliage dry is in direct line with the natural requirements of the plant. The carnation shows by its structure that it is adapted to a dry atmosphere. The thick, smooth leaves, the firm epidermis and the waxy bloom that whitens the surface, are all devices for conserving moisture. A fairly moist soil and a dry atmosphere are, therefore, the ideal requirements for the carnation, as indicated by the structure of the plant; and the experience of the observant florist corroborates the deduction.

Some of the progressive commercial carnationists have devised methods of treating the carnation under glass, that leave little to be desired in connection with the subject of bacteriosis. Mr. Fred. Dorner early adopted what has become by slight, subsequent modification, a satisfactory system for guarding against bac-

*The ammoniacal copper carbonate is prepared by adding enough water to five ounces of copper carbonate in a wooden pail to make a thick paste. Then add enough ammonia (about three pints) to fully dissolve the copper. This may be kept in a tightly stoppered bottle as a stock solution, and a little added to the water at each sprinkling. It should be diluted about one hundred times, that is the formula will make about fifty gallons of an ordinary strength fungicide.

teriosis. A similar system was also early put into use by Mr. C. W. Ward, also a very successful carnationist.

Mr. Dorner* uses netting of galvanized iron wire with about one inch mesh cut into strips about fifteen inches wide. These strips are bent into a somewhat rounded \wedge -form, about six inches high and eight inches wide, and placed between the rows of plants (Fig. 22). A support for the foliage is thus made, which gives perfect circulation of air beneath, and permits of watering the soil without wetting the leaves. The flowering stems are supported upright by a network of twine stayed by wires, stretched above at two different levels (Figs. 21 and 22).

Mr. Dorner has authorized the following statement of his method of watering, which is the most important part of the treatment: The beds are watered in the usual way in the early fall, while the plants are yet so small that the foliage only partially shades the ground, and the weather does not necessitate the use of furnace heat. After becoming well established the wire netting is put in place between the rows, first removing all dead leaves and useless branches from the plants. The watering is now done entirely by placing the end of the hose between the rows under the wire screen. The usual nozzle is discarded, as the stream of water is too strong, and washes the soil away from the roots, and in its place a special form of nozzle is used, devised by Mr. Dorner. This discharges the water laterally through quarter-inch openings, the force of the stream having been broken by striking against the closed end formed of an inturned cone of metal. The amount of the watering is a matter of judgment, and can not be stated in the form of a rule. It depends very largely upon the weather outside, and also upon a variety of other conditions. The evaporation from the benches and walks is sufficient to keep the air of the house moist enough for the best health of the plants, and spraying the foliage is only rarely done after firing begins. During the winter of 1894-95 the foliage was not sprayed from November until April, and a thoroughly healthy growth was maintained, with an almost entire absence of red spider, less than a half dozen plants showing any trace of the insect. In previous years it has been the custom to spray the foliage at intervals of about three weeks with water, to which a small amount of copper sulphate and ammonia have been added, making a very weak fungicide. The quantities used were not reduced to any fixed amounts. The spraying was only done on bright days, when the plants would dry off before night. It is believed that not a little of the success of this treatment is due to the vigilance with which it is carried out. Much care is taken that only healthy plants are placed in the houses, and constant watchfulness is exercised that by no accident or oversight does the disease gain a foothold. The aim is to have healthy plants, and to keep them so by guarding every avenue of attack.

There is similarity to Mr. Dorner's method, and yet some important differences in the details as arranged by Mr. C. W. Ward,† who also uses a wire netting, but bent into a sharp \wedge -shape. He uses, after having tried and discarded various other kinds, a half inch square meshed net called wire lathing, and finds that it is

*"American Florist," x (1894) p. 196.

† "Florist's Exchange," vii (1894), p. 83.

easier handled and lasts longer than the twisted mesh net. It is bought in 150-foot rolls, the widths used being twelve inches for dwarf growers and fifteen inches for tall growers. It is cut into lengths about four inches shorter than the inside width of the bench, and doubled over a board to the required \wedge -shape, and is then shoved in between the rows (Fig. 24). A system of wires and strings above, somewhat similar to Mr. Dorner's, supports the flower stems (Fig. 23*).

The advantages of this plan are, according to Mr. Ward, "A sufficient support to base of plant to keep it off the ground and afford ample circulation of air through the open space to keep the soil properly ventilated. This space affords first-class facilities for cultivating the soil, watering without wetting the foliage, as well as spraying the base of the plants and applying any needed mulch, while the flower stems are erectly supported in a free, airy and natural position, without bunching and without any shading of the plants, and blooms can be neatly and rapidly picked."

Both the teaching of the laboratory and the experience of the cultivator unite in showing that an efficient protection against bacteriosis of carnations under glass (the disease is not troublesome out of doors) is to support the foliage well above the ground so as to permit free circulation of air, water the soil without wetting the foliage, spray the foliage at suitable intervals with a weak fungicide, only spray when the foliage will dry rapidly, ventilate well to prevent the air from becoming too moist, and keep the plants free from green aphids. The methods for carrying out this program, which have already been given, can be modified to meet the needs of individual carnationists.

It is well to note that this line of treatment is equally well adapted to prevent rust, spot, fairy ring and the other fungous diseases which attack the carnation plant.

SUMMARY.

1. Bacteriosis of carnations is a widespread disease of the carnation plant only recently recognized.
2. It is seated in the leaves, but affects the whole growth of the plant and checks the production of flowers.
3. The disease is caused by parasitic bacteria entering the plant from the air through the stomata, or occasionally by the punctures of aphides.
4. The germ associated with the disease may be separated and shown by artificial infection of healthy plants to be the cause of the disease.
5. The germ will grow well at any temperature not inimical to the life of the carnation plant.
6. The disease does not usually affect other pinks beside the carnation, but may be artificially transferred to several species.
7. Plants outside the pink family will not contract the disease, naturally or artificially.
8. Any varieties of carnation may be affected, but old and weak or poorly grown varieties are most susceptible.

*For the use of Figs. 23 and 24 the Station is indebted to the kindness of the publishers of the "Florists' Exchange."

9. Plants may be kept essentially free from the disease by keeping the foliage dry and preventing the presence of aphides.

10. Watering a carnation house is to be done by directing the stream of water between the rows beneath wire netting arranged to support the foliage.

11. Overhead spraying is only to be done occasionally on bright days, and with water containing a small amount of ammoniacal copper carbonate.

EXPLANATION OF PLATES.

PLATE I. Fig. 1. Branch of carnation showing diseased areas at *a*, *b* and *c*. Plant inoculated from pure culture in potato infusion on January 15, 1890. Infectious material applied to surface of youngest expanded leaves at end of stem. Drawing made after six weeks, showing the small yellowish dots of the disease where the infection was applied, and all other parts of the plant normally healthy. The leaf marked *c* was so small at the time of inoculation that only its tip was touched by the fluid, while the four or five leaves beyond this were too far within the bud to be reached by the fluid, and entirely escaped the disease. Natural size and color.

Fig. 2. Single leaf of carnation, upper surface, showing yellowish dots where bacteriosis has started from a surface application of fluid culture, made March 28, 1889. Area of application discolored by culture fluid. Natural size and color.

PLATE II. Test tube cultures of *Bacterium Dianthi* on nutrient acid gelatin, to show characteristic appearance. Temperature 12° C. Drawn natural size and color.

Fig. 3. Three days' growth. Yellow color not yet noticeably developed.

Fig. 4. Ten days' growth. Showing the characteristic yellow color and special outline of growth.

Fig. 5. Same culture as shown in Fig. 4, but turned one-fourth around to show the peculiar "feathered" manner in which the germs have penetrated the gelatin and formed colonies beneath the surface. This only occurs when the gelatin is of a certain degree of softness.

PLATE III. *Bacterium Dianthi*. Figs. 6-10 show the changes in form and rate of multiplication of four individuals under continuous observation. Temperature 35° C, maintained by a thermo-regulator.

Fig. 6. The four individuals at the beginning of the period.

Fig. 7. The four individuals after seven minutes.

Fig. 8. After twenty-seven minutes.

Fig. 9. After thirty-two minutes; two of the individuals moved outside of the field of the microscope, and could not be readily followed.

Fig. 10. After thirty-nine minutes; only one of the original series of individuals remains within the field of vision.

Fig. 11. Typical form of *Bacterium Dianthi*. From agar-agar culture 40 days old. \times about 2000.

Fig. 12. Growth forms in drop culture after 24 hours; *a* motile stage, *b* non-motile stage in which there is great activity of division, but the individuals are no longer free to move because of the secretion of a mucilaginous envelope, *c* temporary filaments, *d* zoogloea in the early stages of formation. \times 700.

PLATE IV. Growth of *Bacterium Dianthi* in plate cultures. \times 200.

Fig. 13. The form assumed on nutrient neutral gelatin after two days' growth. Colonies spreading, zoogloea in only moderate abundance, color a pale cream tint.

Fig. 14. The form assumed on strongly acid cultures, otherwise similar to the preceding. Two days' growth. Zoogloea far more abundant, color a light orange tint.

PLATE V. Formation of zoogloea in drop culture. \times 700; three leaves of carnation, natural size.

Fig. 15. A portion of the field as seen in drop culture of corn (maize) infusion, after three days' growth. A very abundant formation of zoogloea.

Fig. 16. Healthy leaf of carnation.

Fig. 17. A carnation leaf, healthy except in the upper half where it shows bacteriosis from an application of a drop of fluid culture of the germ. Inoculated Dec. 10, 1889, drawn as it appeared six weeks later.

Fig. 18. A leaf badly affected with bacteriosis from a natural infection, showing later stages of the disease prior to withering of the leaf.

PLATE VI. Cross sections of leaves magnified.

Fig. 19. Section through a carnation leaf after the cells have been partially disorganized by the prolonged action of bacteriosis, showing the inroads of *Bacillus subtilis* and other kinds of saprophytic bacteria, which complete the destruction begun by *Bacterium Dianthi*. The stomatal passages are filled, and the adjacent surface of the leaf is overrun. $\times 400$ diameters.

Fig. 20. Cross section of the leaf of Japan pink affected with bacteriosis from an artificial infection with *Bacterium Dianthi*; *a* passage of stoma filled with bacteria, *b* air chamber beneath stoma, *c* epidermal cells showing eroded walls, with bacteria closely appressed to the eroded surfaces, *d* parenchyma cells in which the chlorophyll grains are being rapidly disorganized by the bacteria, *e* partition walls between cells perforated and broken down by the bacteria, *f* cells yet remaining comparatively free from attack.

PLATE VII. Views in the carnation houses of Mr. Fred. Dorner, of Lafayette, Ind.

Fig. 21. General view of carnation house with short span to the south and low benches. Photographed in November, just after putting the wire netting in place and stretching the first level of strings. On the right hand side the supports are in place to hold the second level of strings.

Fig. 22. Side view of bench, showing the manner of placing the wire netting and height of the first level of strings.

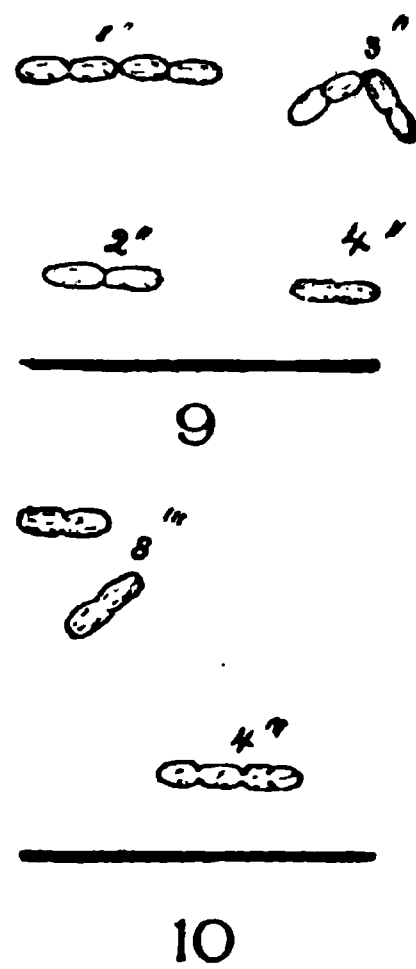
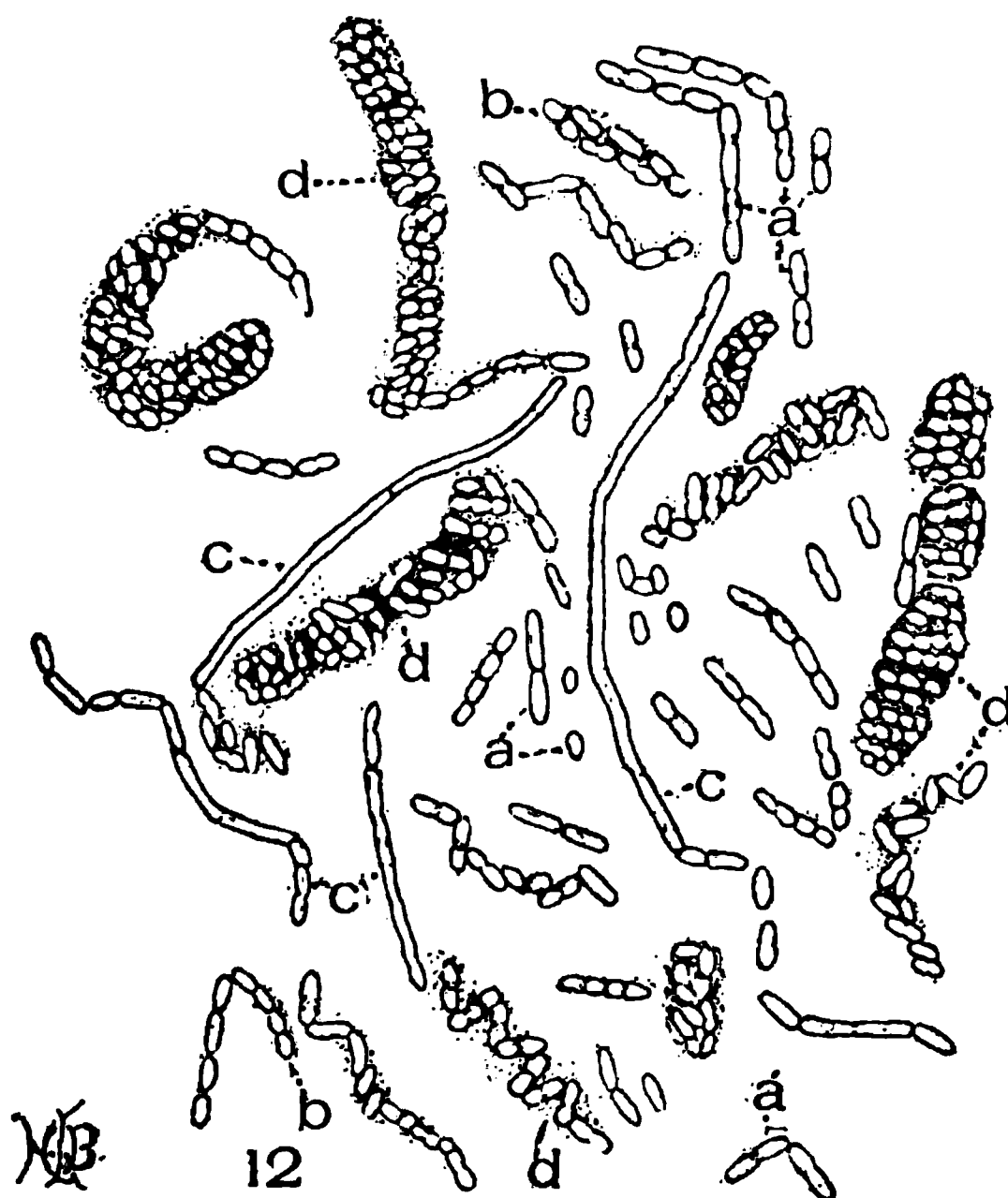
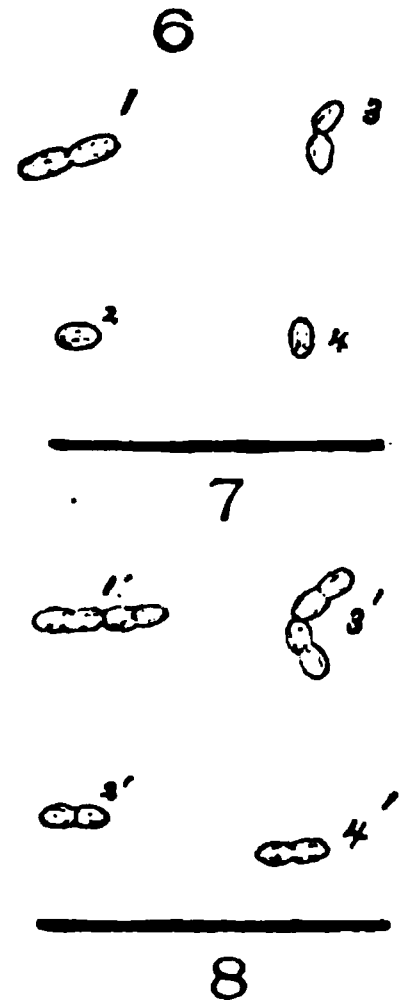
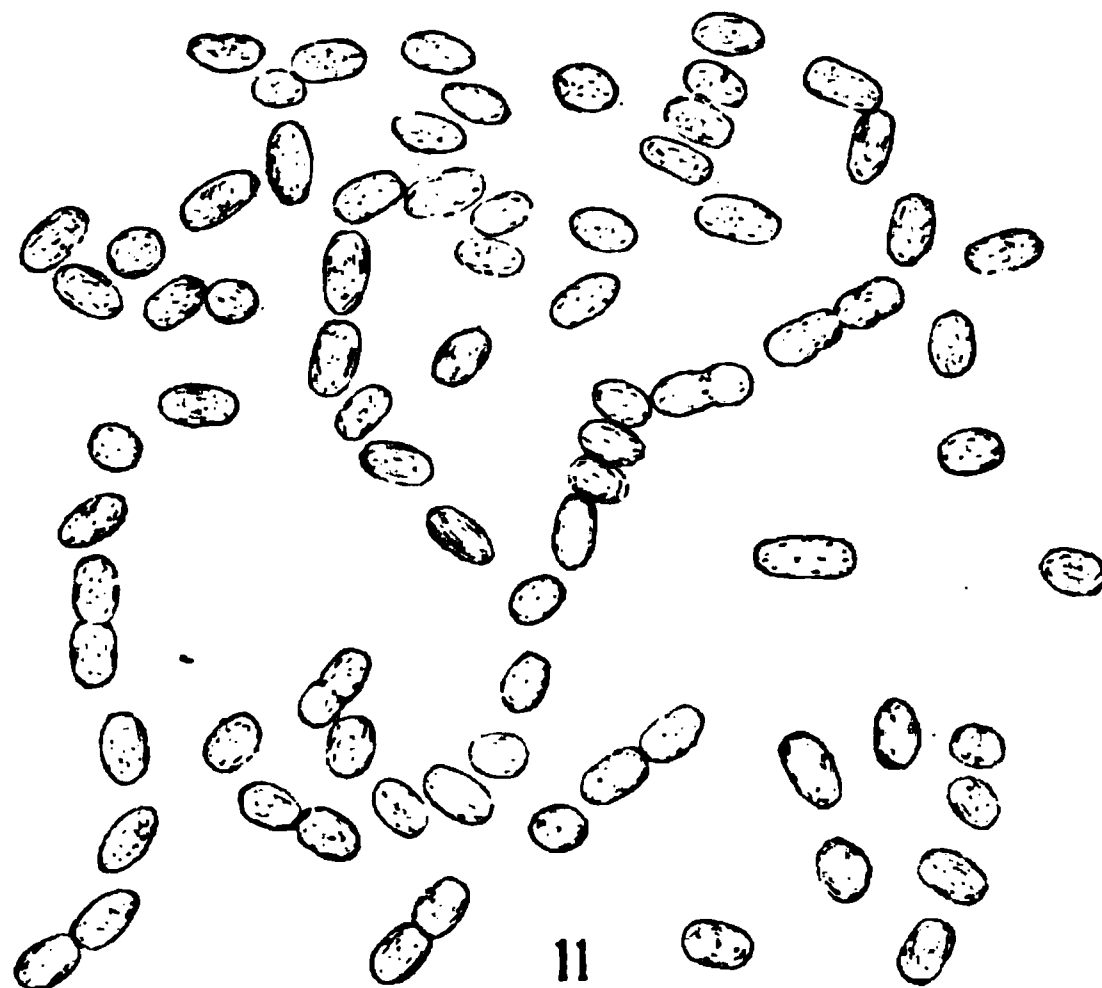
PLATE VIII. Views in the carnation houses of Mr. C. W. Ward, of Queens, N. Y.

Fig. 23. General view of carnation house properly wired and netted. In the middle bench the plants have not yet reached the upper wires of the supports, while in the bench at the left the buds are above the upper wires.

Fig. 24. Side view of bench showing exact method of bending and placing the netting, and its efficiency.

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BULLETIN 59, PLATE III.

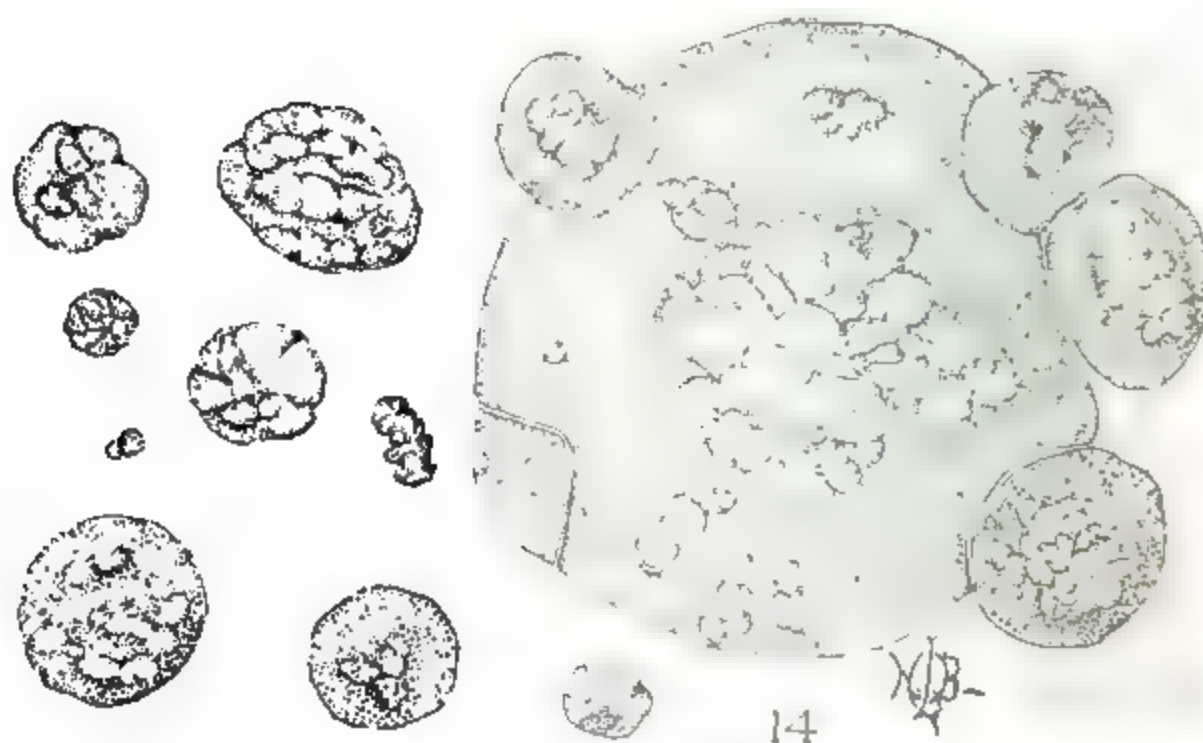
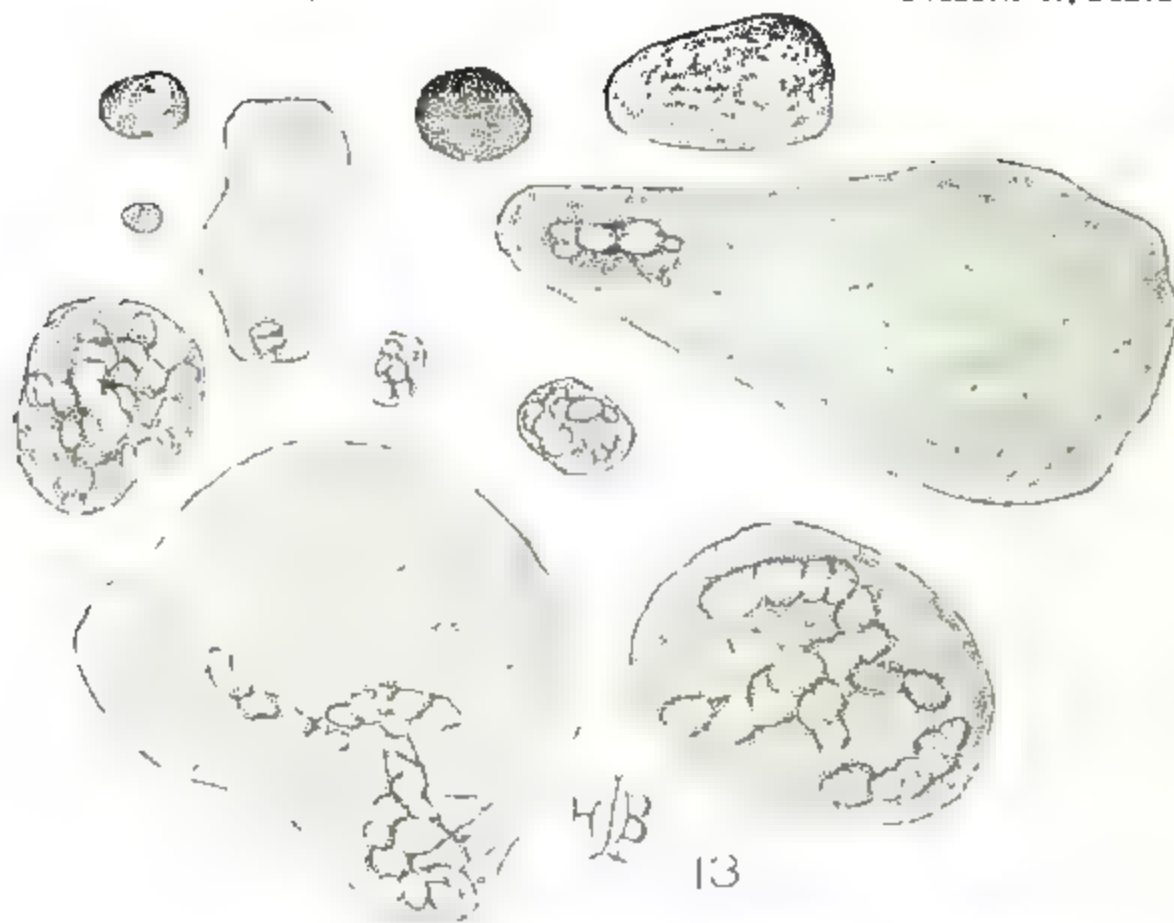


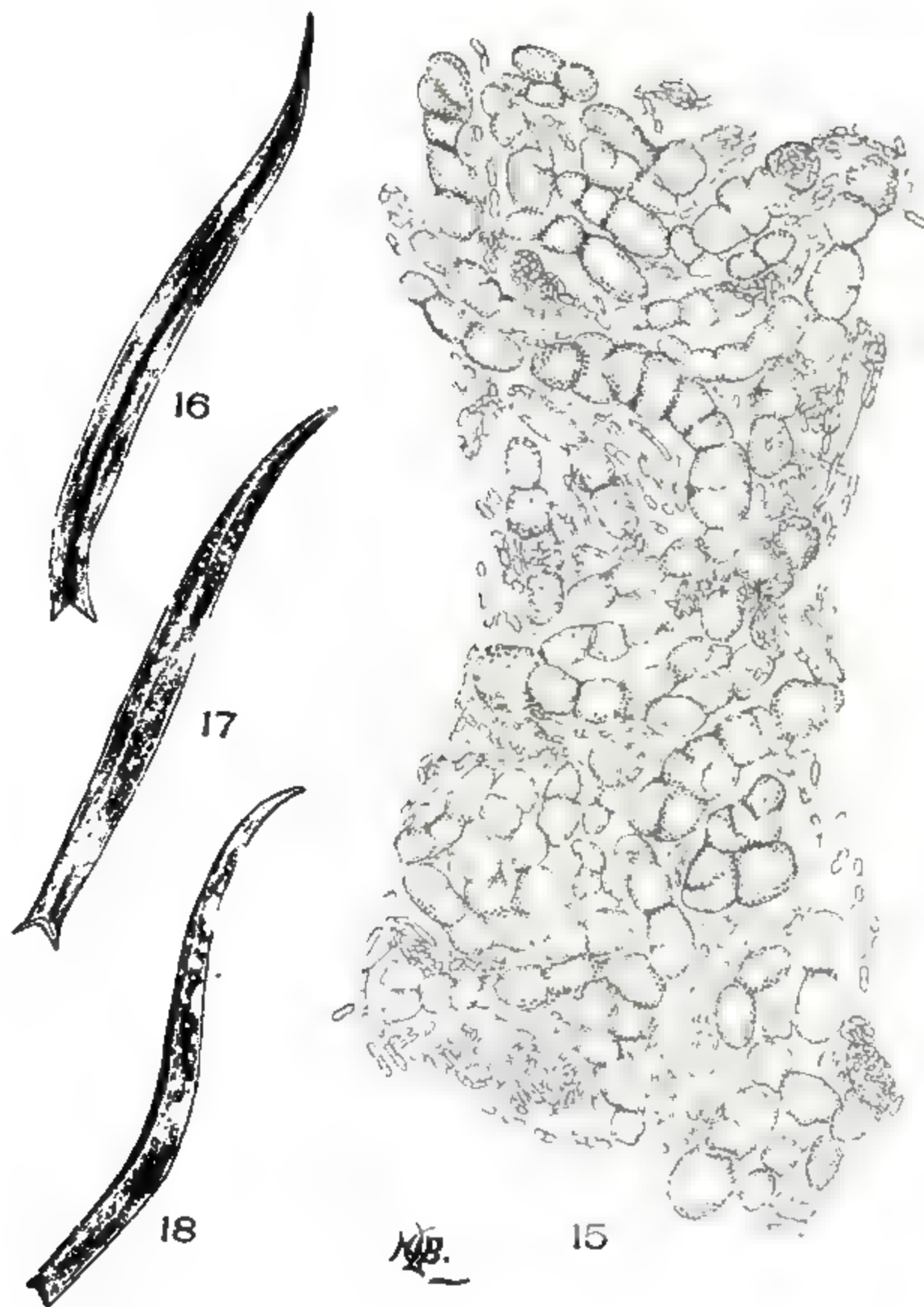
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Bacterium Dianthi in various stages of growth.

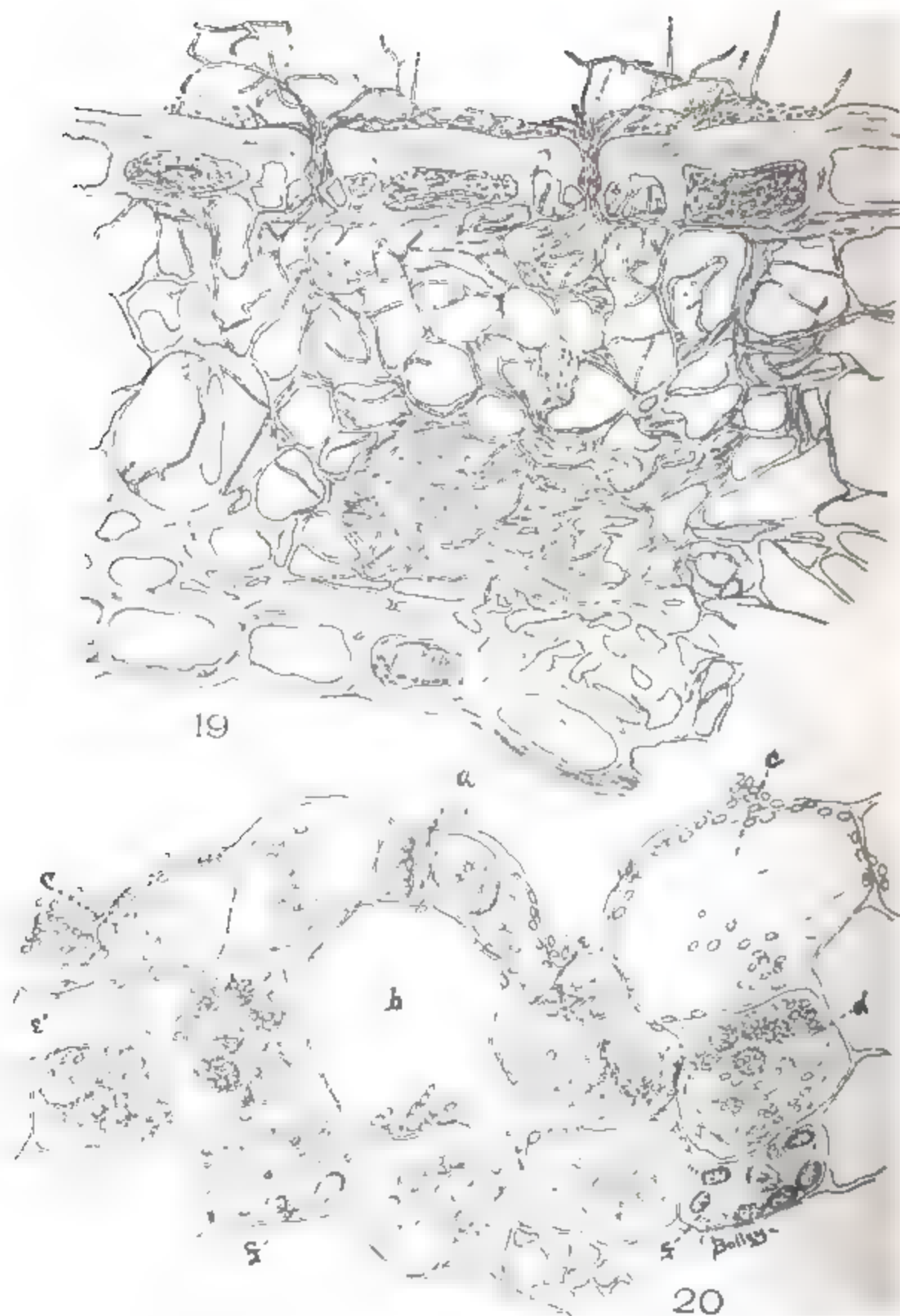
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BULLETIN 59, PLATE IV.

Colonies of *Bacillus Dianthi*.



Gross appearance of healthy and diseased leaves.
Zoogloea in drop culture.



Sections of bacteriosed leaves in both earlier (20) and later (19) stages of disease.

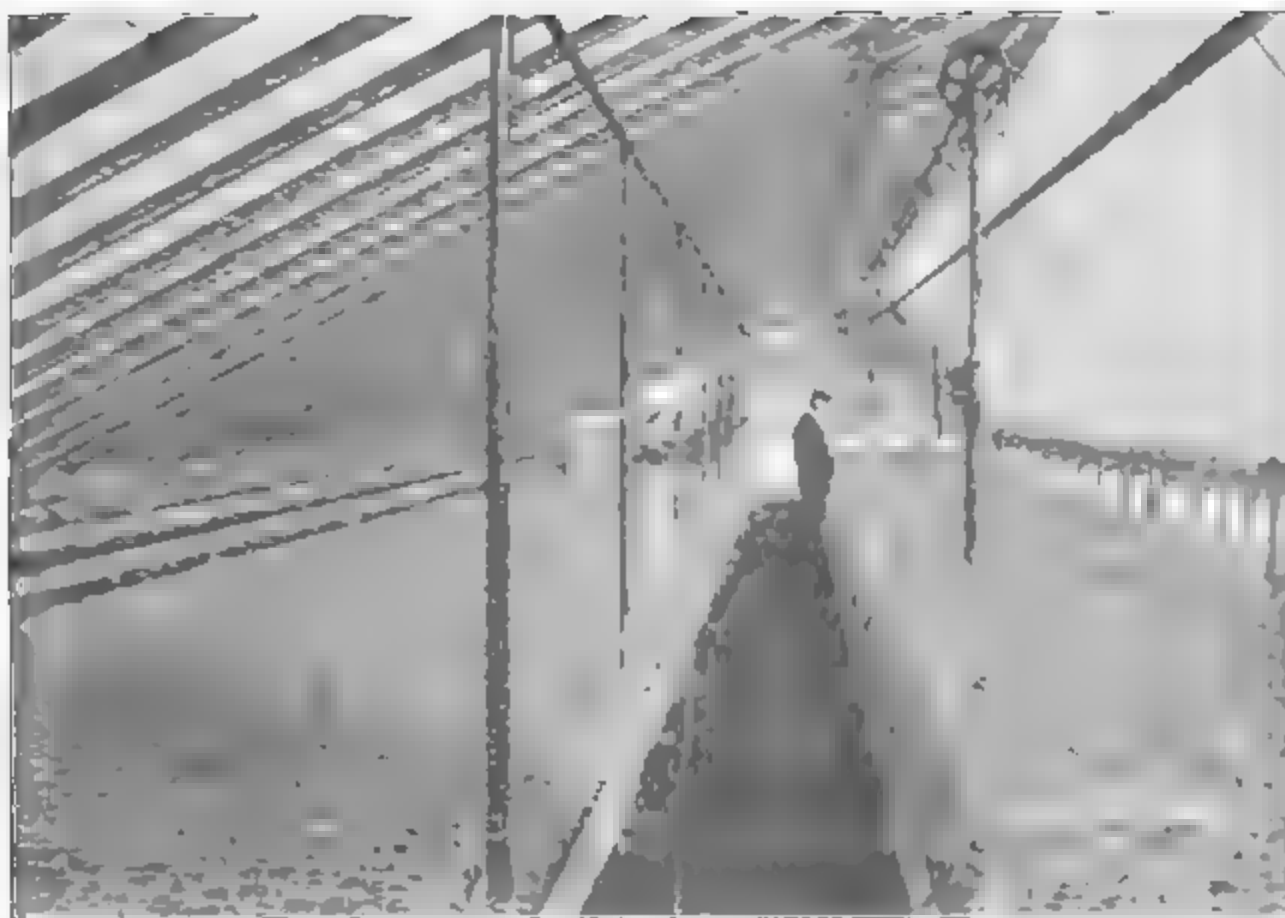


Fig. 21.



Fig. 22.

Views in Mr. Dorner's Carnation Houses.



Fig. 23.

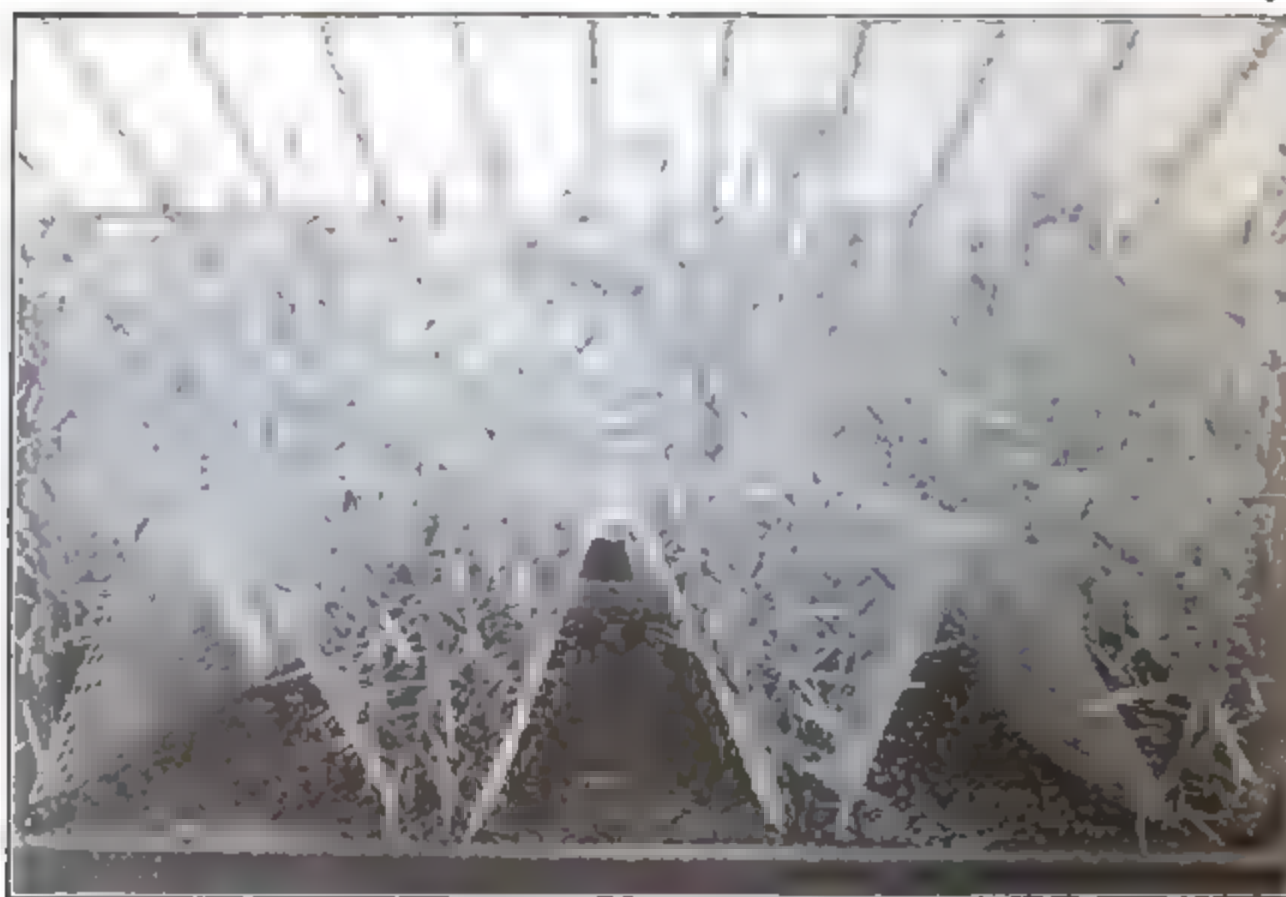
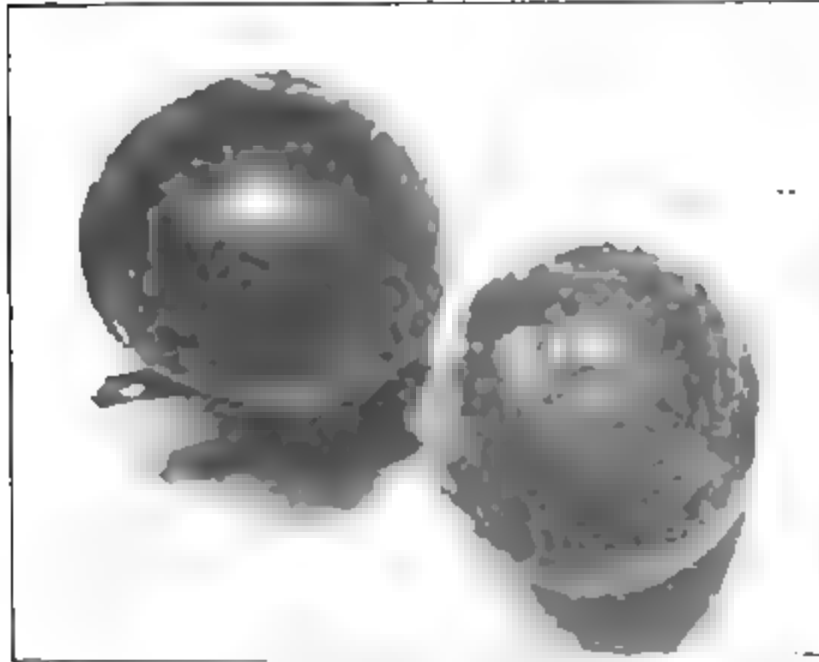


Fig. 24.

Views in Mr. Ward's Carnation Houses.

BULLETIN No 60. VOL VII. APRIL, 1896.

THE AMERICAN PERSIMMON.



A preliminary bulletin on its habits, distribution in Indiana, methods of propagation and cultivation, and suggestions concerning its improvement.

BY JAMES TROOP AND O. M. HADLEY.

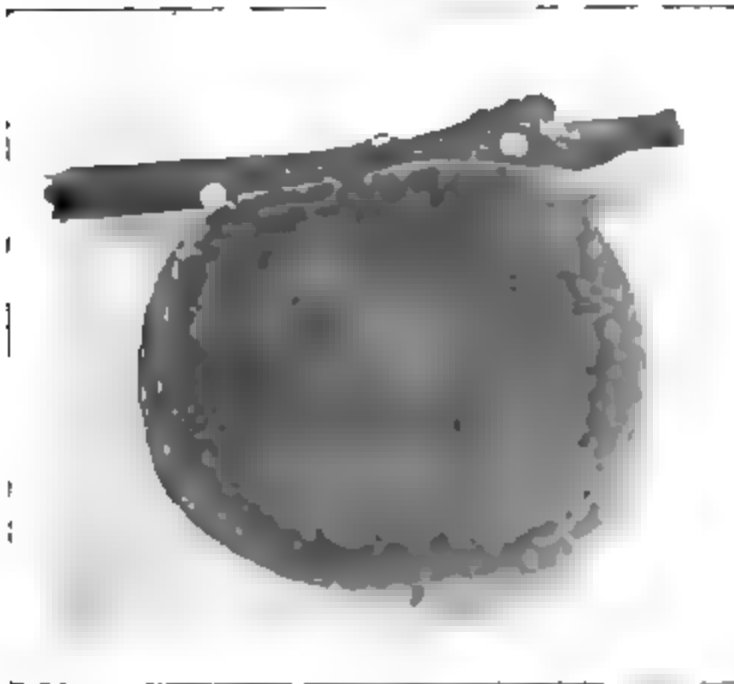


Fig. 25.—HICKS. (Natural size.)

The native persimmon, or date plum, is one of our neglected wild fruits which has heretofore received but little attention from the fruit-growers of this country, although it possesses many desirable qualities which, when brought to a higher state of perfection by selection and cross-fertilization, will certainly cause it to be more highly appreciated by all lovers of good fruit. But little literature is to be found on the subject, and so the general public is quite ignorant concerning its real merits. The fruit is scarcely known, except by those who live in sections of the coun-

try where it grows wild, and even in these localities but little attention has been given to its cultivation.

From recent personal investigations we have found the persimmon growing wild in many portions of the southern half of this State, and producing, in some instances, a fruit of excellent quality and in great abundance; and yet so little attention is given to it by the farmers in these localities that hundreds of bushels of fruit are annually allowed to waste on the ground. There are various reasons why this fruit has been hitherto neglected. One is the exceedingly astringent, or puckery, principle which the green fruit contains, and which remains with most wild varieties until thoroughly ripe, some never losing it entirely. Again, in most instances, where cultivation has been attempted, suckers, or seedlings, have been used for planting, and these generally die, or if they live produce inferior fruit, or prove to be sterile. Another discouraging feature was that it required a long time for the trees to come into bearing. But a new condition of things is being brought about, so that these difficulties will soon be largely removed. New methods of propagation and cultivation are being introduced in its culture, so that now trees frequently begin bearing at from three to five years from the bud, or graft, and we believe that this fruit is capable of being improved to such an extent as to make it of the highest commercial importance, and equal to that of some of the Japanese varieties.

It is this prospective value that has induced us to undertake some experiments looking towards the improvement of the fruit by selection and cross-fertilization, as well as budding and grafting the finer varieties already in cultivation. Two years ago this work was placed in charge of Mr. O. M. Hadley, who is in charge of the Sub-Station at Danville, Hendricks County, and he has the preliminary work already well under way.

DESCRIPTION AND BOTANICAL CHARACTERS.

The persimmon, or date plum (*Diospyrus Virginiana*, L.), belongs to the order *Ebenaceæ*, which is so named in consequence of several species of this genus yielding the black wood called ebony. It is a native of North America, and is found growing wild in most of the southern States, where it produces fruit in the greatest abundance. It is especially adapted to the soil and climate of the southern half of Indiana, but will ripen its fruit as far north as the great lakes.

In November, 1895, Mr. J. C. Grossman, of Lagrange County, sent us samples of fruit taken from a tree growing in that county. This fruit averaged a little less than an inch in diameter, was of very good quality and practically seedless, the seeds being about the size of small watermelon seeds and averaging about two seeds to the fruit. This tree was produced from seeds sent from Kentucky during the war, which were planted during the spring of 1862, where the tree now stands. It is now about thirty feet in height, and bears heavy crops every year.

The tree is usually of small size when grown in the open ground, reaching a height of twenty to thirty feet. When grown in a forest it often reaches a height of

sixty to seventy feet, and from two to three feet in diameter. The wood is quite hard and elastic, but is said to rot very quickly when placed in the ground. The habit of suckering, or sprouting, from the roots when they become broken, which the tree possessor, renders it objectionable on land that is wanted for cultivated crops, as it is very difficult to eradicate from the soil. Says John B. Elliott, of New Harmony, Ind.:* "No animal that I know of will eat it, even sheep and goats pass it by; hence in localities where it is very prolific it causes the farmer no little labor in subduing it." "The mature trees," says Mr. Elliott, "many of which are of great age, antedating this century to a time of which no man knoweth, vary in size from six to eight inches to three feet in diameter, and from twenty to eighty feet in height. The former are on poor, thin land, while the latter are found, if any have escaped the woodman's ax, in the rich alluvial river bottoms, equaling in height the sweet gum and other large trees found in such places. The grain of the wood is remarkably fine, scarcely discernible in most trees, the heart, or colored portion, being quite small. In days gone by, when large driving-wheels in mills were constructed with wooden cogs, this timber was much sought after for that purpose on account of its durability and strength in such places. It soon decays, however, when exposed to the weather after cutting."

The leaves are simple, alternate, ovate-oblong, acuminate, entire, glabrous, shining above and paler underneath, of a leathery texture; petioles short and downy. In some instances the leaves are very large, measuring ten inches in length and five inches in width, giving the tree a handsome appearance.

The flowers are *monoecio dioecious*, and borne on short pedicels in little clusters or singly, in the axils of the leaves. Calyx 4-parted; corolla tubular or bell-shaped, and usually of a pale yellow color. Styles 4-lobed at the apex; ovary 8-celled, but frequently the cells do not all contain seeds. The sterile flowers generally have 16 stamens and the fertile ones 8, the latter being imperfect.

The opinion held by some that a male or non-bearing tree is needed to fertilize the blossoms of the fruitful tree is erroneous; both sterile and fertile flowers appear on the fertile tree. Occasionally, however, trees are found which do not bear fertile flowers, and of course are worthless so far as the production of fruit is concerned. These trees, however, produce more honey, or nectar, than the fertile ones, as shown by the much greater number of honey bees which visit these in comparison with the fertile trees. This is one of the compensations which nature has provided to insure the proper fertilization of the pistillate flowers, for the bees in visiting the staminate flowers for pollen and honey become dusted with the pollen, which is transferred to the fertile flowers during the course of their rambles.

The fruit stalk is very short, bearing a sub-globose fruit ranging in size from one-half inch to two inches in diameter, depending on the variety, and the number of seeds which they contain, the cultivated varieties usually being the largest, although we have found this difference in size to exist among the purely wild varieties. The seedless varieties are usually quite small, although we have

* In a private letter concerning the persimmon.

received a seedless fruit from Mr. Ransom Byerly, of Floyd County, which was three-fourths of an inch to an inch in diameter. The tree which bore this fruit is about twenty-five years old, a foot in diameter and thirty feet high and has borne fruit every year for twenty years.

The fruit has a very disagreeable, astringent quality when green, or but partly ripe, but this disappears in most varieties when the fruit becomes fully ripe. The date of ripening varies from the first of August to December. The old notion of early botanists that this fruit must all be subjected to the action of frost before it becomes edible is now known to be false, as many varieties ripen their fruit in August and September, long before the appearance of frost. In fact, these early ripening varieties are preferable because of their greater market value, since they present the best appearance, and have sold for from six to eight dollars per bushel in the large cities.

The fruits vary greatly as to the number of seeds which they contain. Most of the old wild varieties are full of large seeds, which is a most undesirable quality, but in many of the newer varieties only two or three seeds are found in a single fruit, and some are practically seedless. The fruit differs also in quality: some varieties are as sweet as dates, while others never become edible, being so exceedingly puckery or astringent that neither sun nor frost has any appreciable effect on them.

PROPAGATION.

The persimmon is readily propagated from seeds, which should be procured in the fall or early winter, and planted in the same manner as peach pits. The young seedlings will often attain a height of over two feet the first season. These seedlings, especially from cultivated varieties, can not be depended upon to reproduce themselves. In fact, this fruit varies greatly in the wild state. Twenty trees raised from the seeds of one parent tree may produce twenty distinct varieties; we must therefore resort to building or grafting the young stocks with buds or scions from the variety which we desire to propagate. A desirable seedling variety may be multiplied by breaking up the roots of the parent tree, thus causing it to throw up sprouts or suckers. These, however, are difficult to transplant successfully owing to a deficiency of root development.

TIME TO BUD.

Both budding and grafting should be done in the spring. Fall budding has proved a failure on account of the flow of sap which prevents the adherence of the bud to the stock, but the operation may be readily performed in the spring as soon as the bark will slip freely.



Fig. 26.

Root grafting in midwinter has not been successful with us thus far, but very satisfactory results have followed crown grafting in the nursery row in the spring. To do this satisfactorily the stocks should be at least two years old. Either cleft or splice grafting may be used, covering well the cut portions with grafting wax. When grafted in this way a growth of from two to four feet may be expected the following season. As far as tested, there appears to be very little, if any, difference in the ease with which different varieties may be grafted. Figs. 26 and 27 illustrate the methods used in grafting the persimmon.

TOP WORKING OF OLD TREES.

This operation may be as easily and successfully performed on a persimmon tree as it can be on an apple tree. Many farmers have growing on their farms trees which are either barren or which bear inferior fruit. By top-working such trees with improved varieties they may soon be transformed into trees of great value. Plate IX represents a tree that has been worked over in the manner referred to. It had never borne a persimmon until after it was top worked, but began bearing the next year after the operation was performed. In working over such trees the grafting should be done in the younger and more vigorous branches. Scions should not be inserted into large branches, but these should be cut off and allowed to throw out several strong, thrifty shoots, which may be grafted the second season. The surplus shoots may then be removed.



Fig. 27.

TRANSPLANTING.

The persimmon is more difficult to transplant successfully than almost any other kind of fruit tree. The tree has a long center or tap root, and if too much of this root is cut off in transplanting the tree will be most sure to die. The safest plan is to secure quite young trees, one or two years from the graft being preferable. Older trees may be successfully planted if they have been transplanted once or twice while growing in the nursery. The soil where the trees are to be transplanted should be thoroughly pulverized with a subsoil plow to a depth of at least eight inches below the bottom roots, so that an abundance of moisture may be supplied to the young growing roots during the first season.

Transplanting is most successfully done in autumn, as the tree then becomes adjusted to its place by spring, and the roots, if properly pruned before planting, will be nicely calloused and ready to throw out their fibrous rootlets as soon as the warm days of spring appear.

SOIL AND LOCATION.

The persimmon is similar to the peach and plum in its choice of soil and location, but it will grow well on almost any kind of soil, from rich bottom land to poor thin soil of the hill tops. In fact, we have seen great numbers of these trees growing with the greatest luxuriance and bearing very fine fruit in abundance on the red clay hills of Lawrence and Orange counties, where the soil has become so exhausted from constant cropping for a half century or more that the land has been abandoned and given over to nature again. Still it requires but a glance to see that this land yet contains a plenty of the right kind of nourishment to produce abundant crops of this and other kinds of fruit if properly handled. A warm soil, however, well exposed to the sun, is best adapted to the persimmon.

CULTIVATION.

The persimmon may be greatly improved by cultivation. It is especially necessary that the trees be well cultivated for the first few years after planting, until they become adapted to their new surroundings. The trees will stand a great deal of neglect when once well started, but should not be subjected to such treatment if one expects to secure the best results. In the wild state the trees will thrive on very thin land and under seemingly discouraging circumstances, and still bear fruit of very good quality, but the largest and best fruit is only produced when the trees are kept in a perfectly healthy condition by cultivation.

VARIETIES.

Until recently there were no well-defined varieties under cultivation. We have found, however, many well-marked varieties growing wild. They differ in quality as much as our cultivated apples. Some are very astringent, others are insipid and worthless, while still others are sweet and delicious. Almost every tree is a variety of itself, as the persimmon, like the apple, does not reproduce itself from seed with certainty. In the wild state it is sometimes found growing in clusters of ten or a dozen trees, and all apparently of the same variety, but these probably came from the roots of the original or parent tree.

The fruit differs in size from that of a small wild plum to that of the large cultivated kinds, an inch and a half to two inches in diameter. They also vary greatly in form; some are globular, others either conical or oblong, those of the globular form predominating. The following are some of the varieties which are being tested at the experimental station: Shoto, Early Bearing, Golden Gem, Daniel Boone, Hicks, Kansas, Early Golden, Smeech, a seedless variety originating in Tennessee, and several seedlings from a variety found growing in northern China, sent us by the U. S. Department of Agriculture, Washington, D. C.



Top-worked Persimmon Tree.



Shoto Tree and Fruit.



Fig. 28—SHOTO. (*Reduced one-third.*)

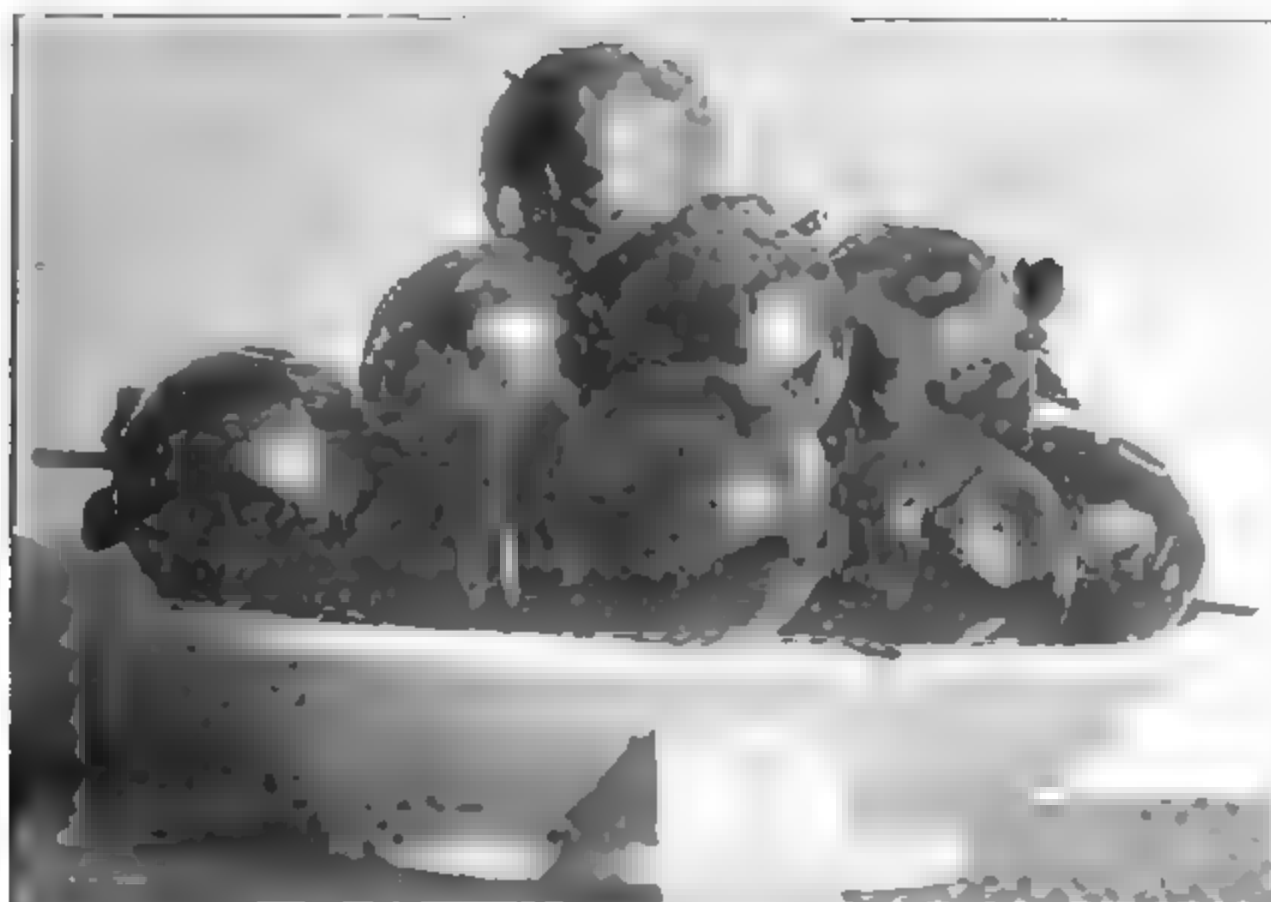


Fig. 29—EARLY BEARING. (*Reduced one-third.*)



BRANCH OF EARLY BEARING. (*Reduced one-third.*)

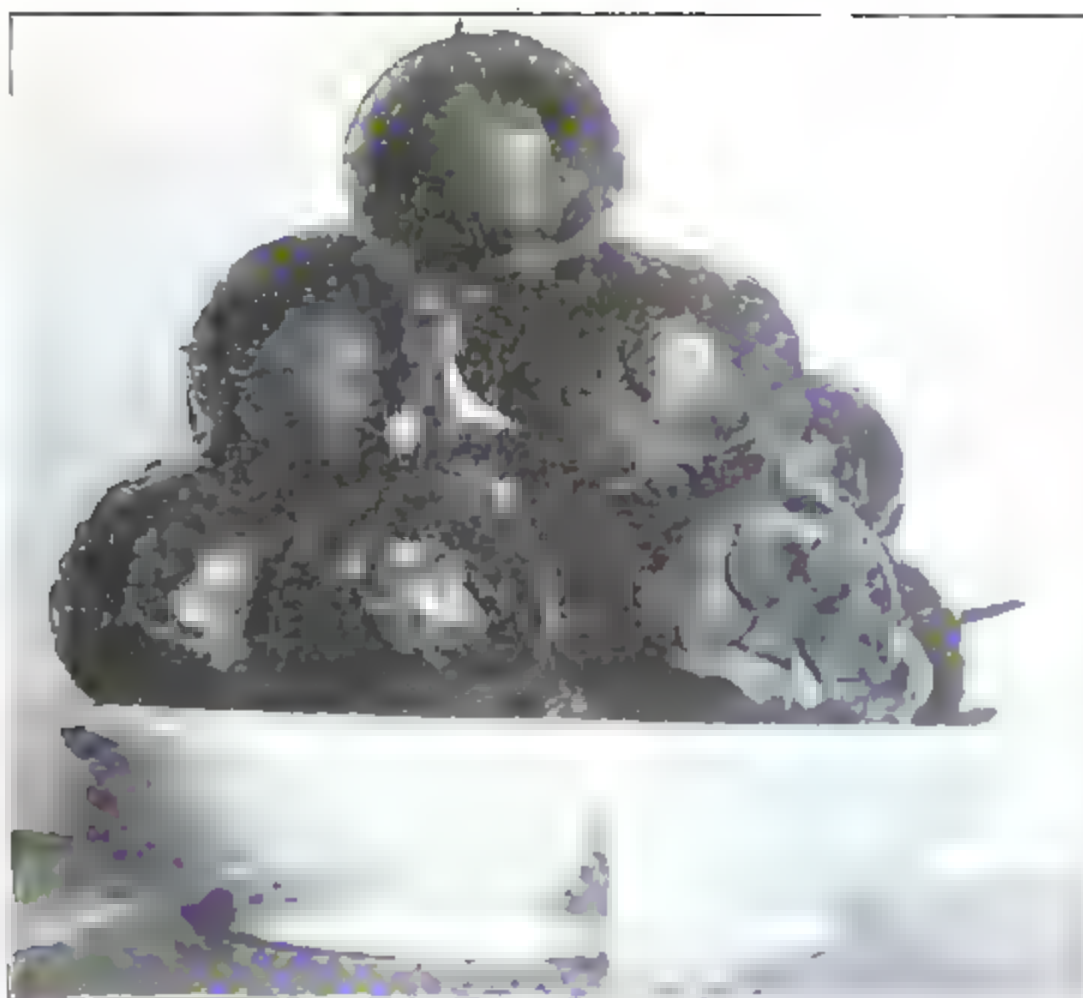
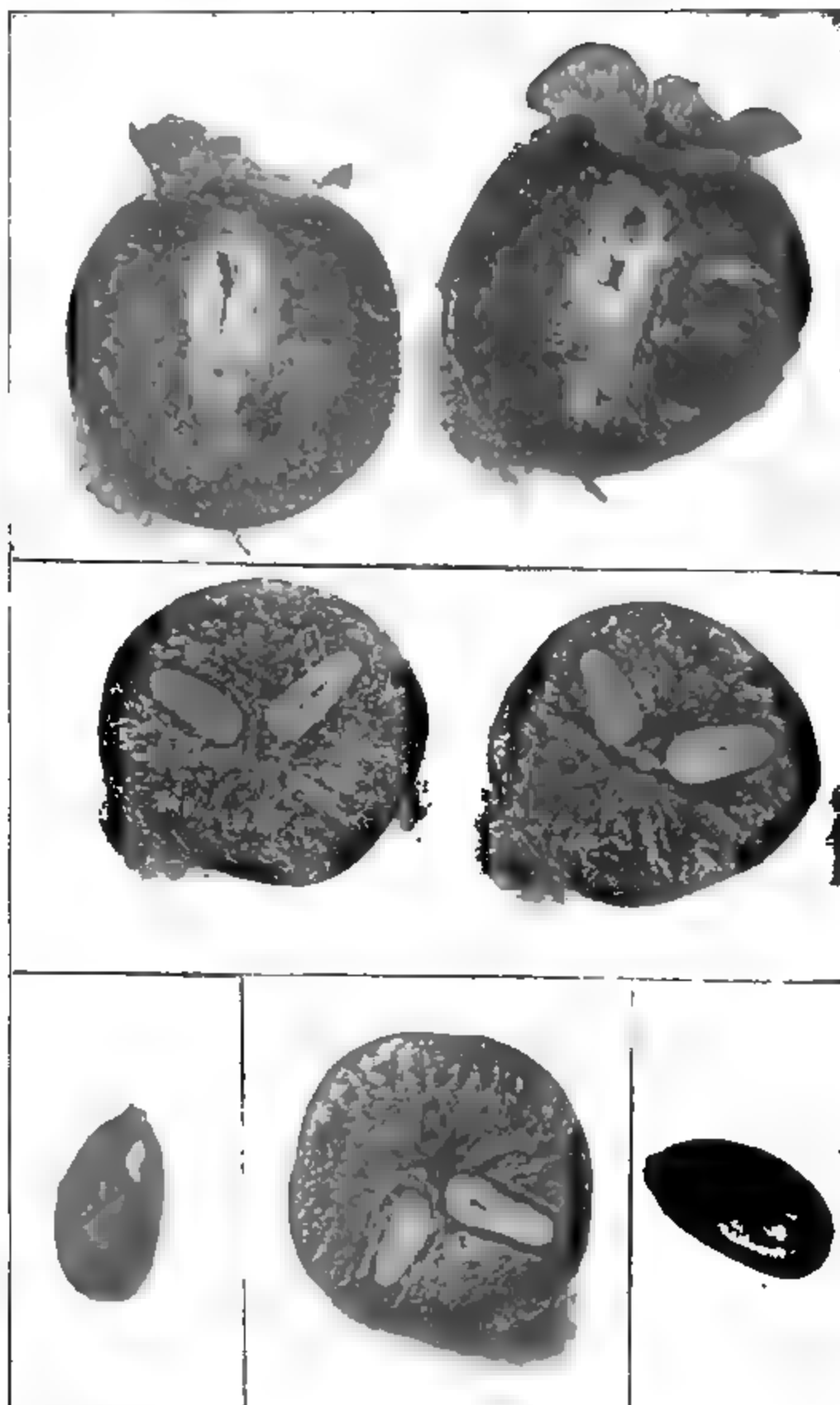


Fig. 30—GOLDEN GEM. (*Reduced one third.*)



Fig. 31—DANIEL BOONE. (*Reduced one third.*)



GOLDEN GEM.

Vertical and Cross-section and Seeds. (Natural size.)

DESCRIPTION OF VARIETIES.

SHORT.—This variety was introduced by A. C. Chambers, Danville, Hendricks County, Ind. The fruit is oblong-ovate, slightly conical, large to very large; color dull yellow, with blush in the sun, with rather tough skin and few seeds. Quality, very good; season, October; tree, an early bearer, productive and a vigorous grower. The original tree began bearing at three years of age. Plate X is a tree of this variety, showing the fruit after the leaves have fallen. Plate XI, Fig. 28, shows the fruit reduced one-third.

EARLY BEARING.—This was introduced by James Little, Cartersburg, Hendricks County, Ind. Fruit, round-ovate; medium to large; dull yellow and of good quality. Ripens earlier than Daniel Boone, and though smaller, is a more desirable variety. The tree is a good grower, early bearer and very productive. Plate XII shows a branch of this variety, and Plate XI, Fig. 29, the fruit reduced one-third.

GOLDEN GEM.—This variety was introduced by Logan Martin Borden, Clark County, Ind., and is grown quite largely by him for the market. Fruit, roundish-oblong, medium to large; color, dark orange to red; seeds, few; flesh, soft, very rich and sweet, free from astringency, even if picked before fully ripe; commences to ripen about the last of August and continues until October. The tree is an early bearer, productive and a very rank grower, with large, thick leaves. Plate XIII, Fig. 30, shows the fruit reduced one-third, and Plate XIV, cross sections and vertical sections of the same, and also the seeds, reduced the same.

DANIEL BOONE.—The fruit is roundish-oblate, yellow, with a dull blush in the sun. Skin rather tough and seeds numerous; quality, good, though not so rich as some other varieties; season, October and November; tree, handsome, productive and a vigorous grower, with very large, thick leaves. See Plate XIII, Fig. 31.

HICKS.—This was introduced by Hicks Trueblood, Washington County, Ind., who has grown it extensively for a number of years. The fruit is large, roundish-oblate, rich mahogany in color, but few seeds, and of excellent quality. We failed to secure the fruit in season to enable us to get a good photograph, but Fig. 25 on page 437, will give an idea of the size and shape of the fruit.

KANSAS.—This was introduced from Missouri. The fruit is roundish, slightly oblate; rather large; splashed with red on yellow ground; flesh, tender, rich and highly flavored; season, September. The tree is productive and very handsome in general appearance.

SMEECH.—Fruit, roundish-oblate; medium size; dull yellow, with red splashes; superior quality, being very rich and sweet; tree, a good grower and productive. Introduced from Pennsylvania.

EARLY GOLDEN.—Oblong; medium to large, rich yellow color; very sweet and of excellent quality; skin, thin, and seeds few in number; ripens in September without frost. Twigs and under side of leaves covered with whitish down; tree, productive and handsome. Introduced from Illinois.

Besides the above named varieties, we have received a number of well defined wild varieties, some of which produce fruit an inch and a half in diameter, and of very good quality. Some of these are practically seedless. As a rule, these are smaller but these facts all tend to show that many of the wild sorts are capable of being improved by cultivation and careful handling.

HANDLING THE FRUIT.

The persimmon is not as perishable as some people suppose; it can be kept for several months. The fruits seldom rot, but dry up, and in this condition they have been kept till March and April by simply keeping them in a cool, dry place. They keep better, however, by packing them away in sugar in a jar or other tight vessel. They may also be canned by simply placing the clean, ripe fruit in a glass jar and pouring over them a syrup made of granulated sugar and water. It is not necessary to heat the fruit before canning. They may be used as occasion demands for making puddings, etc. The following recipe is given here for the benefit of those who have never eaten this fruit treated in this manner:

RECIPE FOR PERSIMMON PUDDING.

One pint of persimmon pulp, made very fine.
One cup sugar.
One quart sweet milk.
Three teaspoonfuls flour.
One teaspoonful ground cinnamon.
Two teaspoonfuls baking powder.

Bake in a moderately hot oven for an hour, or until it is nicely browned. Cool and serve with whipped cream. The fruit used for this purpose should be of superior quality, and perfectly ripe before using.

The long-keeping qualities of this fruit enables the grower to ship his fruit to distant markets without fear of loss from decay. Besides this, there are many other points favoring the introduction of the persimmon as a commercial fruit. First, the people are beginning to appreciate it, and this will soon create a demand for it. Like all other kinds of fruits, however, in order to create a demand for large quantities, it is absolutely essential that nothing but the choicest varieties be placed upon the market, and these in an attractive form. A few crates of small, seedy, astringent fruit would very quickly destroy the best of markets. The fruit is easily handled, and good fruit will bring good prices in the markets. Again, this fruit is almost entirely free from the attacks of insects and fungi, and a failure to produce a crop is a very rare occurrence, as the blossoms seldom open till all danger of frost is past.

Our best varieties are early and continuous bearers, but there is still an opportunity for improvement in quality and size. When, by careful cultivation and

propagation, we shall have succeeded in bringing these qualities to a sufficiently high standard, then we expect the persimmon to occupy an important place among our cultivated fruits.

COMPOSITION OF THE PERSIMMON.

BY H. A. HUSTON AND J. M. BARRETT.

During the investigation of the Horticultural Department described in the preceding pages, an examination of available literature failed to reveal any analysis of the persimmon. The samples collected by the station were utilized for purposes of analysis.

Five samples of wild fruit and one sample of the cultivated variety, Golden Gem, were used. The five samples of wild varieties differed quite conspicuously in form and size. They were received in the laboratory with calyx and a portion of the stem attached, while the cultivated sample had the calyx and stems removed and was in the usual condition for market.

The relative amounts of pulp and seeds are shown in Table I. With the pulp is included the thin skin that covers the pulp.

Analysis of the pulp of all the samples and of the seeds of No. 1 were made, using the A. O. A. C. method for food analysis.*

The results of these analyses appear in Table II. The analyses of other fruits are also given for purposes of comparison.

It will be seen that the dry matter is much greater in the persimmon than in the other fruits. The total dry matter in grapes varies from eight to twenty-four per cent., but the highest dry matter found in grapes is considerably less than the lowest amount found in any of the persimmons. This high amount of dry matter in the persimmon is due to the presence of a large amount of material in the group called the "nitrogen free extract," which includes sugar and starch and allied substances. In the persimmon the material is principally sugar, but it is grape sugar. A special test for cane sugar was made, and it was not present in the fruit.

*Bul. 43. Chem. Div. U. S. Dept. of Agri., p. 360.

TABLE I.—Amounts of Pulp and Seeds in Persimmons.

Laboratory Number.	Number of Persimmons Used.	Total Weight, Grams.	Average Weight, Grams.	Weight of Pulp, Grams.	Weight of Seeds, Grams.	Number of Seeds.	Average Number of Seeds.	Per Cent. of Pulp.	Per Cent. of Seeds.	Where Grown.	Variety.
1	355	47.16	14.1	40.65	6.51	999	2.98	86.15	13.85	Pike Co.	Wild.
5	56	10.84	19.3	8.95	1.89	294	5.07	82.58	17.42	Lawrence Co.	"
6	61	8.58	14.1	7.15	1.43	241	3.95	83.33	16.67	"	"
7	73	4.81	6.3	4.10	.71	127	1.74	85.24	14.76	Ripley	"
8	256	15.11	5.9	12.39	2.72	619	2.42	82.00	18.00	"	"
9	111	15.17	14.0	13.78	1.79	249	2.25	88.50	11.50	Clark	Golden Gem.

No. 1, a wild variety, compares favorably in every respect with the cultivated variety. No. 6 has more seeds. No. 5, while remarkable for its large size, has a high average of seeds. In flavor they are all satisfactory.

TABLE II.—Chemical Composition of the Persimmon.

Laboratory Number.	Dry Matter.	Water.	Ether Extract.	Crude Protein.	Crude Fibre.	Ash.	Nitrogen Free Extract.	Total Nitrogen.	Albuminoid Nitrogen.	Amid Nitrogen.	Albuminoids.
1	29.10	70.90	0.42	1.21	1.30	0.63	25.54	0.194	0.157	0.037	0.98
5	28.92	71.08	0.23	0.62	1.02	0.75	26.30	0.100	0.085	0.015	0.53
6	35.70	64.30	0.33	0.93	1.56	0.70	32.18	0.148	0.125	0.023	0.78
7	34.99	65.01	0.36	0.86	1.60	0.83	31.34	0.138	0.130	0.008	0.81
8	48.21	51.79	0.42	1.04	1.83	1.04	43.88	0.166	0.151	0.015	0.94
9	34.14	65.86	0.16	0.66	1.26	0.73	31.83	0.105	0.076	0.029	0.48
Seeds from No. 1	90.14	9.86	3.04	10.60	17.60	2.07	56.83	1.690	1.290	0.400	8.10
Strawberries*	9.20	90.80	0.70	1.00	1.40	0.60	5.5				
Grapes†	21.83	78.17		0.59	3.60	0.53	17.11				
Apples‡	22.26	77.74	0.50	0.95	1.47	0.46	18.88				

*Average of nineteen analyses reported by E. H. Jenkins and A. L. Winton, Jr. Exper. Sta. Record, Voll. 11, p. 704.

†Konig, quoted in Blyth's Foods, p. 134.

‡Mass. State Agr. Exper. Sta. Rep., 1894, p. 434.

The seed is very hard, and a microscopical examination failed to reveal any starch. The tissue resembles that of the date seed and a considerable portion of the nitrogen free extract of the seed probably consists of hydrocellulose. The high amount of nitrogen present as a non-abuminoid in the seed is quite remarkable, and is much greater than is usually found in seeds.

Analysis of the ash of the pulp and seeds of No. 1 were made, and the following results obtained:

TABLE III.
ASH ANALYSES.

	Ash from Pulp.	Ash from Seeds.
Silica and traces of unburned carbon	1.52	20.12
Ferrie oxid (Fe_2O_3)	0.44	1.19
Manganese oxid (Mn_2O_3)	0.08	0.10
Calcium oxid (CaO)	4.74	6.76
Magnesium oxid (MgO)	2.23	6.96
Phosphoric acid (P_2O_5)	7.26	13.36
Sulphur trioxid (SO_3)	6.84	10.53
Potassium oxid (K_2O)	53.45	87.62
Sodium oxid (Na_2O)	2.36	.82
Carbon dioxid (CO_2)	15.94	0.00
Chlorine	0.30	0.11
Moisture	4.32	2.52
	99.46	100.09
	.067	.024
Less oxygen equivalent to chlorine	99.393	100.066

A special examination for alumina showed that this base was not present.

It was thought best to separate the material of the pulp into more groups than those included in the ordinary food analysis. For this purpose the pulp of sample No. 1 was subjected to the following treatment:

Five grams of air dry material, containing 3.84 per cent. of water, were extracted with chloroform for sixteen hours in a Soxhlets apparatus; the residue insoluble in chloroform was then extracted for sixteen hours with 80 per cent. alcohol in the same apparatus. The residue was then removed from the extraction tubes, placed in flasks and treated with cold water for seventy hours, the flasks being shaken at frequent intervals.

The residue from this treatment was treated with boiling water under return condenser for two hours.

The residue from the hot water treatment was boiled in the same apparatus for one hour with 150 c. c. of 1½ per cent. sulphuric acid, and the residue from the acid treatment then boiled an hour with the 150 c. c. of 1½ per cent. sodium hydrate. The results of these operations appear in Table IV.

TABLE IV.

SPECIAL EXTRACTION OF PULP.

EXTRACTED BY	MATERIAL EXTRACTED CONSISTS MAINLY OF	In Air Dry Material.	In Original Materials.
Chloroform	Oils and coloring matter	2.76	0.836
80% alcohol	Sugars	47.22	14.292
Cold water	Gums, pectin, organic salts	14.10	4.263
Hot water	Same as cold water and starch	4.99	1.508
Sulphuric acid 1¼%	Starch isomers, hydrocellulose	6.26	1.895
Sodium hydrate 1¼%	Albuminous substances and hydrocel- lulose	18.61	5.632
Remaining undis'lv'd	Cellulose	2.19	0.662
Moisture content . . . . .	. . . . .	3.84	70 903
		99.97	99.991

The ash ingredients are distributed throughout these extracts.

A specific test in the ripe fruit failed to reveal the presence of tannin, to which material the astringent taste of the green persimmon is probably due.

The cold water extract had an odor resembling horehound candy.

The material is dried with difficulty, and for this reason it was thought best to make the extractions on the partially dry material, as when the last traces of water are removed there is great difficulty in extracting all the oily material. It is probably on this account that the chloroform extract is nearly double the ether extract which was made on the material that had been dried for five hours in a current of hydrogen at the temperature of boiling water.

With the alcohol and water treatment the weight of the extracts was checked by drying the residues and weighing them.

A comparison of Tables II and IV will show that the nitrogen free extract of Table II, 25.54 per cent., agrees very closely with the sum of the extracts from alcohol or sodium hydrate after the allowances have been made for real albuminoids, ash and the differences in cellulose and oily material, 25.77 per cent. Table IV brings out clearly the presence of a large amount of sugar in the fruit.

The comparisons of the fruit show that it has a food value considerably greater than any of our common fruits.

Its keeping qualities are good.

The facts that it is improved rather than injured by frost, and that it flourishes on land that has been badly worn and is of little value for other crops, indicate that the persimmon is well worthy of the attention that is now beginning to be devoted to its culture.

The samples of fruit for this work were furnished by Prof. James Troop, who collected many of them; the analytical work was performed by Mr. J. M. Barrett, under the direction of Prof. H. A. Huston, who prepared the plans and methods of the investigation.

BULLETIN No. 61. VOL. VII. AUGUST, 1896.

FIELD EXPERIMENTS WITH WHEAT.

BY W. C. LATTI AND W. B. ANDERSON.

INTRODUCTORY: The year has been a good one for showing the effect of treatment and condition of soil on yield of wheat. The fall of 1895 favored a fair, though not rank growth of wheat. The winter of 1895-6, though not rigorous, was rather trying to the wheat crop, as there was little snow protection, and a good deal of freezing. The alternate freezing and thawing was especially trying to late-sown wheat, as well as to that on poor soil. In all cases, however, when the wheat crop went into the winter in vigorous condition, it came through with little, if any, injury. This fact emphasizes anew the importance of such preparation and fertilization of the ground for wheat as will insure a vigorous fall growth. The unusually warm weather of May produced a very rapid and soft growth of wheat, causing the crop to begin "lodging" in rank spots when not over 15 inches high. The later weather was more favorable, however, permitting the crop to partly straighten up, and fill fairly well, except where the land was very rich. The Hessian fly invaded the wheat on the Station far more than in previous years, although the precautions of destroying the volunteer wheat, rotation of crops and late sowing were all carefully observed. The reason for this state of things is apparent from the fact that on an adjoining farm the old-time practice of sowing wheat after wheat, permitting volunteer wheat to grow after harvest to become a nursery for the fly and early seeding are still faithfully (?) pursued.

The successful combating of insects, as well as noxious weeds and contagious diseases, requires *intelligent, concerted action*, and the sooner farmers learn to act *promptly and unitedly* on these matters, the better for their interests.

In the experiments which follow, the yield of wheat is calculated to the acre in every case.

The experiments were conducted on long, narrow plats, in soil as nearly uniform as could be secured. The plats represented in Tables VI and VIII-XIII inclusive, are each one-tenth acre. The two series of plats devoted to a test of phosphatic marl (see Table VII), were conducted on plats each about one-twentieth acre in area. The remaining plats were, with two exceptions, each one-thirtieth acre in area. The weights of grain per struck bushel were obtained by carefully weighing, in a standard miller's tester, three samples from each plat, and taking the average of the three weights. The comparatively light weight of the wheat in 1896 is due in part to the Hessian fly, and partly to rust which appeared unusually early and was very widespread. The rate of sowing, except as otherwise stated below, was five pecks to the acre.

I. COMPARISON OF VARIETIES.

The present purposes of this experiment are (1) to test the newer varieties of wheat, and (2) to determine how long standard wheats can be grown on the same farm without deterioration. The results of the experiment with varieties are shown in the table below :

TABLE I.—YIELDS PER ACRE OF VARIETIES OF WHEAT, ETC.

VARIETY.	AVERAGE YIELD.		YIELD IN 1896.	
	Years Grown.	Bushels.	Bushels.	Lbs. per Struck Bu.
Velvet chaff, b. b	13	29.50	29.71	59.00
Valley	7	29.37	21.00	60.75
Willits	5	28.07	26.24	60.50
American bronze	2	24.50	20.25	57.00
No. 102	1	19.82	19.82	52.00
Early Arcadian	1	12.58	12.58	53.50
Beaded winter fls	1	22.50	22.50	57.75
Michigan amber	13	29.19	†27.81	59.75
*Velvet chaff, b. b . . . . .	. . . . .	. . . . .	24.69	59.50

*Duplicate of the first.
†Average of four plats grown in another series.
The seed of the three varieties grown but one year was obtained from A. N. Jones, Newark, N. Y. The seed of all the others was produced on the Station farm.

Two points are clearly emphasized, (1) the comparatively indifferent yields of the new varieties which have not become acclimated, and (2) the continued good yields of the other varieties which have been grown continuously here for five to thirteen years on the same farm.

II. QUANTITY OF SEED PER ACRE.

In this experiment, which has been conducted a dozen years, the time of sowing has varied from the 20th to the end of September. Last fall the rate plats were all sown September 30th.

The Velvet chaff wheat, a variety with medium-sized grains, has been chiefly used in this experiment. It was thought best last fall to duplicate the test with Rudy wheat, a large-grained variety.

TABLE II.—BUSHEL PER ACRE FROM THICK AND THIN SOWING.

SOWN PER ACRE.	VELVET CHAFF.		RUDY.	LBS. PER STRUCK BUSHEL, 1896.	
	Average 12 years.	1896.	1896.	Velvet Chaff.	Rudy.
2 pecks	22.89	18.90	25.50	59.00	59.75
3 "	25.48	28.00	27.10	60.25	60.25
4 " *	27.20	28.45	28.45	60.16	60.94
5 "	28.49	26.50	28.90	60.50	61.00
6 "	29.28	26.55	30.00	60.50	61.50
7 "	29.81	30.50	28.90	61.25	61.25
8 "	29.25	23.60	30.50	61.00	61.75

* Average of four plats each year.

It appears that seven pecks per acre gave the highest yield of Velvet chaff in 1896, and also the highest average yield, while eight pecks to the acre produced the highest yield of Rudy. It will be observed, however, that the average yield of Velvet chaff is but slightly greater from the 7-peck rate than from the 6-peck rate, and that the 6-peck rate of Rudy yields only one-half bushel less than the 8-peck rate. The above results have been obtained on land of more than average fertility, as shown by the yields. How much may be due to the spaces between plats (about 15 inches wide), which freely admit light and air, is not known. It seems fair to assume that these spaces, by affording extra feeding room as well as more light and air for the plants, exert an influence favorable to thick sowing. It does not, therefore, seem advisable to sow more than six pecks of wheat to the acre in regular work, provided the land is in good condition, well prepared, and the time of sowing is seasonable. Thicker sowing will generally be found advantageous in late seeding, and in localities where the crop winter-kills badly, as the denser fall growth resulting, acts somewhat as a mulch in winter and insures a better stand the following spring.

III. EARLY AND LATE SOWING.

The results of this experiment, which has been in progress for eight consecutive years, are given in the accompanying table. The work has been conducted on good soil, well prepared.

TABLE III.—YIELDS PER ACRE FROM EARLY AND LATE SOWING.

WHEN SOWN.	BUSHEL PER ACRE.		LSB. PER STRUCK BU.
	Average of 8 years.	1896.	1896.
Sept. 13	*34.34		
" 18-21	†29.97	27.40	60.67
" 25-28	28.67	26.10	60.50
Oct. 2-5	26.02	19.85	59.25
" 10-12	21.19	6.50	58.75
" 16-19		‡3.18	53.25

* Average of two favorable years.
† Average of three plats each year, except 1891, when but two plats were used.
‡ 1896 only.

The table brings out clearly two facts, (1) the decreased yield from each later sowing, and (2) the reduced weight per measured bushel. Early sowing, within the limits of the table, has proved best both for quantity and quality. It would not be wise, however, in this latitude, to sow earlier than the middle of September, as the early sown wheat is more liable to the first attacks of the Hessian fly.

IV. EFFECT OF CHANGE OF SOIL ON YIELD OF WHEAT.

The purpose of this experiment is to determine whether change of seed—using that produced on a different soil—has an appreciable effect on the yield of wheat. Seed wheat of several good varieties, which had been grown at the Station, was sent out in the fall of 1893 to be sown in the north, central and south parts of the State. In 1894 and again in 1895, the wheats, grown from this seed, were returned for trial alongside the same varieties that had been grown continuously on the Station farm. The soils in which the seed sent out was sown, were in DeKalb County, a clay loam with yellow clay subsoil; in Whitley County, clay with an admixture of sand and humus; in Madison County, a clay loam; in Jefferson County, a light clay loam. The land of the Station farm varies from a clay loam to a dark-colored prairie soil—all being naturally drained by underlying gravel.

The experiment was abandoned in Madison County in 1895, owing to the ravages of insects and other adverse influences. In the accompanying tables are shown the counties in which the seed was produced, the varieties under trial, the yields in 1896, and the average yield for the two years, 1895 and 1896. For comparison, Velvet chaff and Michigan amber wheats, grown continuously in this (Tippecanoe) county, were sown at intervals in the series of plats, as shown in the table.

TABLE IV.—YIELDS FROM SEED GROWN ON DIFFERENT SOILS.

COUNTY IN WHICH SEED WAS GROWN.	VARIETY.	Average of Two Years.		Results in 1896.	
		Bush. per acre.	Lbs. per struck bu.	Bush. per acre.	Lbs. per struck bu.
Tippecanoe	Velvet chaff.	19.89	58.25	19.90	58.50
	Mich. amber	21.85	58.00	26.95	59.50
Whitley	Mich. amber	25.45	57.50	26.15	59.50
	Red clawson	19.65	59.00	18.80	57.00
	Jones' fife	17.74	58.38	16.75	58.25
	Velvet chaff.	18.88	58.25	18.75	59.00
	Poole	21.68	57.25	21.75	58.50
Tippecanoe	Velvet chaff.	20.68	57.75	17.35	58.50
	Mich. amber	22.86	58.25	26.75	59.50
DeKalb	Rudy			25.10	59.75
	Mich. amber	25.88	59.25	29.00	59.50
	Jones' fife	21.30	58.75	18.10	57.50
	Velvet chaff.	20.20	58.38	21.65	57.75
	Red clawson	23.19	57.38	22.50	56.25
Tippecanoe	Velvet chaff.	20.80	59.50	23.85	59.00
	Mich. amber	24.13	59.75	29.00	60.00
Jefferson	Jones' fife	17.90	59.75	20.05	58.50
	Poole	22.31	59.50	23.50	59.00
	Mich. amber	25.55	59.25	30.60	59.50
	Red clawson	22.76	57.63	23.35	56.25
Tippecanoe	Velvet chaff.	18.00	59.75	21.35	60.00
	Mich. amber	22.53	59.25	23.55	60.00

The average yields from seed produced in Tippecanoe County and from that grown elsewhere are as follows:

SEED GROWN.		Velvet Chaff.	Mich. Amber.	Jones' Fife.	Red Claw- son.
Tippecanoe	{ 1895	19.22	18.42	23.00	25.25
	{ 1896	20.59	27.81	*	*
	{ Av.	19.91	23.12	. . . .	. . . .
Elsewhere	{ 1895†	19.17	22.19	19.40	22.38
	{ 1896	20.20	28.50	18.98	21.87
	{ Av.	19.69	25.35	19.19	22.13

* Not grown at the Station in 1896.

† The average for 1895 includes the yields from seeds produced in Madison County.

It appears from the above summary that of the four wheats named, Michigan amber, *only*, produced a greater yield from imported seed than from the home-grown. It appears further that both Michigan amber and Velvet chaff show a slightly greater weight per measured bushel from home-grown than from imported seed. It seems fair to conclude from the facts given that change of seed may increase the yield in *some* cases and *not* in *others*. The result would be more conclusive but for the failure (through oversight) to sow home-grown seed of Jones' fife and Red clawson wheats in the fall of 1895.

V. EARLY AND LATE HARVESTING OF WHEAT.

This experiment was begun in the fall of 1891 and has been continued to the present, with the exception of 1895, when the intense drouth destroyed the value of the trial. The experiment was conducted with the Michigan amber wheat *only*, up to the fall of 1895, when it was decided to make the same test with Rudy wheat.

The purpose of the experiment is to ascertain at what stage of maturity the heaviest grain and the largest yield can be secured. The first cutting in 1892 was when the wheat was in the "dough." Since that year it has been the aim to cut first when the wheat is in the "milk," second in the soft dough, third in the hard dough, fourth when ripe and fifth when "dead" ripe. The Michigan amber has been harvested in the several stages of maturity stated above. The Rudy wheat, though cut this year on the same date as the Michigan amber, was really about three days behind the latter in ripening. The results of the experiment, for 1894 and 1895 *only*, when the wheats seemed to ripen *normally*, are given in the following table:

TABLE V.—YIELDS FROM EARLY AND LATE HARVESTING.

HARVESTED IN 1896.	Michigan Amber.					Rudy—1896.	
	Bush. 1894.	Lbs. per bush.	Bush. 1896.	Lbs. per bush.	Av. No. bush. 2 years.	Bush.	Lbs. per bush.
June 12th	25.3	59.0	22.5	58.5	23.93	21.4	57.5
June 16th	30.5	60.9	24.1	59.5	27.30	23.2	59.5
June 20th	*34.3	63.4	*25.2	59.8	29.78	24.3	60.2
June 24th	35.8	63.3	25.0	58.8	30.42	23.9	60.0
June 27th	33.5	62.7	23.9	58.8	28.68	20.8	59.5

*Average of three plats.

The fourth cutting gave the highest yield in 1894. The third cutting—June 20th—produced the largest yield in 1896. At this date the Michigan amber was out of the dough and the Rudy was in the full dough stage. In case of both varieties the third cutting produced the heaviest grain. The facts clearly indicate the desirability of harvesting the wheat as soon as possible after it has reached the full dough stage. It is proper to add that, of necessity, the plats were cut with the cradle; but there is no reason to believe that the self-binder would have materially changed the result.

VI. DEPTH OF PLOWING.

This experiment was begun with corn and continued four years, when it was decided to pursue a four-course rotation on the series of plats set apart for the test. The rotation adopted is (1) corn, (2) oats, (3) wheat, (4) clover. The present plan is to plow the land only for the corn and the wheat, stirring the soil by means of plow and subsoil plow, to the depths shown in the table below. For four years, beginning with the spring of 1891, the plats were plowed as shown in the table. In the spring of 1895 the plats were simply cultivated to a uniform depth with the spring-tooth cultivator and seeded to oats, the second crop in the rotation. Owing to the severe drouth of 1895 the oats were too short to cut with the binder, hence the plats were mown for hay, no record being taken of the growth on the different plats, which, however, appeared to be quite uniform. After the removal of the oat crop the plats were plowed as shown in the table, in the same manner as had been practiced for corn. The series of plats has been well manured and fertilized to make the plats responsive to the depth of plowing if possible. The plats have received uniform treatment in all respects except the depth of plowing. The average yields of corn on the several plats, as well as the yields of wheat in 1896, are given in the table.

TABLE VI.—YIELDS FROM DEEP AND SHALLOW PLOWING.

No. of Plat.	DEPTH OF PLOWING.	Bushels per acre.		Wheat— Lbs. per struck bu.
		Corn— av. of 4 yrs.	Wheat— 1896.	
1	Plowed 8 inches	34.14	33.92	61.50
2	Plowed 4 inches	33.77	33.61	61.00
3	Plowed 6 inches	34.19	31.99	61.50
4	Plowed 8 inches	34.81	32.44	61.00
5	Plowed 6 in., subsoiled 4 in.	34.49	31.49	61.25
6	Plowed 8 in., subsoiled 4 in.	35.00	30.99	61.25
7	Plowed 8 inches	36.05	32.11	59.50
8	*Plowed 8 in., subsoiled 6 in.	34.84	31.91	61.25
9	†Plowed 8 in., subsoiled 8 in.	34.44	31.07	61.50
10	Plowed 8 inches	35.56	29.26	60.50
Average of Nos. 1, 4, 7, 10		35.14	31.93	60.63

*Stirred only 10 inches deep previous to 1894.

†Stirred only 12 inches deep previous to 1894.

From a careful inspection of the table it will be seen that the results are conflicting thus far. The experiment will be continued until definite conclusions can be reached.

VII. TEST OF PHOSPHATIC MARL ON WHEAT.

A phosphatic marl, containing ten to twelve per cent. of phosphoric acid, was tried on two series of wheat plats in the fall of 1896, with the result shown in the following table :

TABLE VII.—YIELDS WITH AND WITHOUT PHOSPHATIC MARL.

No. of Plat.	Pounds Fertilizer.	NORTH SERIES.		SOUTH SERIES.	
		Bushels.	Lbs. per Bu.	Bushels.	Lbs. per Bu.
1	.. . . .	30.47	60.75	20.87	60.50
2	220	28.43	61.50	20.91	61.00
3	.. . . .	28.54	61.50	20.22	60.75
4	220	.. . . .	.. . . .	23.38	61.00
5	.. . . .	.. . . .	.. . . .	24.11	60.50

An inspection of the table shows that the effect of the fertilizer is scarcely perceptible either on the yield or weight per measured bushel.

VIII. WHEAT IN ALTERNATION WITH CORN, WITH AND WITHOUT FERTILIZATION.

One purpose of this experiment is to ascertain what quantities of manure and fertilizers will prove most profitable upon corn and wheat, which crops succeed each other in alternation. Clover is grown as an intercrop in this experiment, and occupies the ground from the wheat harvest until the succeeding spring, when it is plowed under as a green manure for corn. The same plats in the series receive fertilizers for manure each year, but the amounts applied are greater for corn than for wheat. The horse manure has been drawn fresh from the livery stables of Lafayette each year, and, as a rule, it has been applied to both wheat and corn ground just before plowing. The fertilizers have been regularly applied after plowing and harrowed into the soil. The accompanying table gives the results with wheat in 1895 :

TABLE VIII.—FERTILIZATION, YIELD AND PROFIT PER ACRE—SERIES I, 1896.

No. of Plat.	FERTILIZATION.	Lbs. fertil- izer.	Yield per Acre		Incr'd Yield.		Lbs. per struck bush.	Net profit \$ cts.
			Bush. grain.	Lbs. straw.	Bush. grain.	Lbs. straw.		
1	Nothing		5.03	638	. . . . .	. . . . .	55.00	. . . . .
2	*Dissolved bone black	181	31.67	2,058	27.53	1,455	58.75	\$4 86
	†Sulphate of ammonia	211						
	‡Muriate of potash	51						
3	Dissolved bone black	87	24.67	1,970	20.53	1,367	58.50	5 18
	Sulphate of ammonia	132						
	Muriate of potash	34						
4	Nothing		3.25	568	. . . . .	. . . . .	56.00	. . . . .
5	Horse manure	10,000	22.62	2,313	19.02	1,821	59.00	7 24
6	Horse manure	6,670	17.17	1,270	13.57	778	59.05	4 62
7	Nothing		3.95	416	. . . . .	. . . . .	55.50	. . . . .

* 15% phosphoric acid. † 20% nitrogen. ‡ 50% potash.

The net profit in the right hand column is obtained by deducting the entire cost of fertilization from the value of the increased yield of wheat and straw. The wheat is reckoned at 50 cents per bushel and the straw at \$3.00 per ton, which is less than the market value of the fertilizers it contains. No allowance is made for the greater cost of threshing and marketing the fertilized wheat, as its better quality and greater market value will doubtless offset this difference in cost.

TABLE IX.—AVERAGE INCREASE AND PROFIT FROM FERTILIZATION—
SERIES I.

No. of Plat.	FERTILIZATION.	Av. No. lbs. fer- tilizer.	Average Increase.		*Aver. weight per bu.	Av. net profit \$ cts.
			Bush. grain.	Lbs. straw.		
1	Nothing . . . . .	. . . . .	. . . . .	. . . . .	56.25	. . . . .
2	Dissolved bone black	138	} 20.08	2,671	57.25	\$5 65
	Sulphate of ammonia	188				
	Muriate of potash	53				
3	Dissolved bone black	116	} 16.18	1,782	58.00	4 01
	Sulphate of ammonia	143.5				
	Muriate of potash	44.5				
4	Nothing . . . . .	. . . . .	. . . . .	. . . . .	55.83	. . . . .
5	Horse manure	8,250	11.04	1,535	58.75	4 80
6	Horse manure	6,460	9.63	1,286	57.83	4 48
7	Nothing . . . . .	. . . . .	. . . . .	. . . . .	54.13	. . . . .

* Average of three years.

In the table which follows, the *average* increase in yield and profit from fertilization are shown for the *four* wheat crops that have been grown in this series. The increased yield in Table IX includes *not only* the increase on the fertilized plats, but *also* the increase on the flanking spaces which lie between the fertilized and unfertilized plats. These flanking spaces (each 1-20 acre) are cropped the same as the plats and usually show an increase in yield which is due, probably, in part to diffusion of fertilizer and partly to cross-feeding of the crop.

In calculating the profit in the above table the wheat was reckoned at 60 cents per bushel, which is about an average of the market prices here for the time covered. By comparing the profits in Tables VIII and IX we find that the *average* profit is greater on plat 2, and a trifle less on the other fertilized plats, than in 1896. It is also worthy of note that the heavier applications of fertilizers and manures return the larger profits in this series. It will be observed further, that the manure and fertilizers return about the same profit.

IX. CONTINUOUS WHEAT GROWING WITH AND WITHOUT FERTILIZATION.

Wheat is grown continuously in this series, although clover is sown every spring, as an intercrop, to be plowed under, the following August, as a green manure for the succeeding crop of wheat. In recent years the clover has been repeatedly killed by drouth, hence its beneficial effect has been slight. Eight successive wheat crops have been grown since the experiment began, but the first crop was not fertilized. The plan of fertilization is the same as in Series I, and the profits are calculated on the same basis as in Table VIII.

TABLE X.—FERTILIZATION, YIELD AND PROFIT PER ACRE—SERIES III, 1896.

No. of Plat.	FERTILIZATION.	Lbs. Fertilizer.	Yield per Acre.		Inc'r'd Yield.		Lbs. per Struck Bush.	Net Profit.
			Bush. Grain.	Lbs. Straw.	Bush. Grain.	Lbs. Straw.		
1	Nothing		9.17	1,010	.....	.....	56.50	.....
2	Dissolved bone black	96	21.37	2,333	12.79	1,363	57.50	\$1 90
	Sulphate of ammonia	38						
	Muriate of potash	66						
3	Dissolved bone black	93	19.75	2,040	11.17	1,090	56.25	1 74
	Sulphate of ammonia	26						
4	Nothing		8	820	.....	.....	57.25	.....
5	Horse manure	7,500	20.92	2,320	12.76	1,363	58	4 67
6	Horse manure	5,000	16.67	1,978	7.50	1,021	57.25	2 78
7	Nothing		8.33	1,025	.....	.....	57	.....

The net profits are less than in Series I (see Table VIII), but the quantities of fertilizer and manure are also less.

The average fertilization, increase in yield and net profit of the several fertilized crops of Series III are shown below in Table XI. The wheat is reckoned at 60 cents per bushel, as in Table IX.

TABLE XI.—AVERAGE INCREASE AND PROFIT FROM FERTILIZATION—SERIES III.

No. of Plat.	FERTILIZATION.	Average No. Lbs. Fertilizer.	Average Increase.		Average Weight per Bushel.*	Average Net Profit or Loss.
			Bushels Grain.	Pounds Straw.		
1	Nothing		.....	.....	57.90	.....
2	Dissolved bone black	116	6.79	1,188	57.20	†—\$2 93
	Sulphate of ammonia	158				
	Muriate of potash	45.6				
3	Dissolved bone black	85.5	5.49	687	58.48	—83
	Sulphate of ammonia	100.2				
	Muriate of potash	38				
4	Nothing		.....	.....	57.18	.....
5	Horse manure	8,071	5.75	1,128	58.35	1 11
6	Horse manure	5,966	5.17	783	58.25	1 23
7	Nothing		.....	.....	57.42	.....

*Average of six crops.

†The minus (—) sign indicates a loss.

It appears, from the above table, that the commercial fertilizers have been used at a loss in continuous wheat culture, while the manure has returned a small profit.

X. COMPLETE AND PARTIAL FERTILIZATION.

In this experiment wheat is grown in a 5-course, consisting of (1) corn, (2) oats, (3) wheat, (4) grass, (5) grass. The rotation began with corn in 1889, and hence two crops of wheat have been grown, one in 1891 and the other in 1896. The "grass" in this rotation consists of orchard grass and clover. The chief purpose of the experiment is to ascertain the effect of *complete* and *partial* fertilization on the yield of the several crops.

Each of the crops, except grass, is fertilized according to the schedule shown in the following table, but the amounts of manure and fertilizers vary with the crop. The results of the fertilization of the wheat crop of 1896 are set forth in the accompanying table:

TABLE XII.—EFFECT OF COMPLETE AND PARTIAL FERTILIZATION OF WHEAT
—SERIES IV, 1896.

No. of Plat.	FERTILIZATION.	Lbs. Fertilizer.	YIELD PER ACRE.		INCREASED YIELD.		Lbs. per Struck Bush.	Net Profit or Loss.
			Bush. Grain.	Lbs. Straw.	Bush. Grain.	Lbs. Straw.		
1	Nothing		13.50	1,495			57.75	
2	Horse manure	10,000	27.22	2,347	14.18	1,192	59.50	\$3 69
3	Cattle manure	15,000	25.50	2,235	12.46	1,235	59	1 83
4	{ Dissolved bone black	131	23.17	2,930	10.13	1,775	58	* -4 22
	{ Sulphate of ammonia	236						
	{ Muriate of potash	51						
5	Nothing		12.58	615			27.25	
6	{ Dissolved bone black	131	24.96	2,655	11.70	1,745	57.50	-2 14
	{ Sulphate of ammonia	236						
	{ Muriate of potash	51						
7	{ Dissolved bone black	131	28.93	2,817	15.67	1,907	59.75	7 24
	{ Sulphate of ammonia	236						
	{ Muriate of potash	51						
8	{ Sulphate of ammonia	236	16.63	2,007	3.37	1,097	57	-7 56
	{ Muriate of potash	51						
	{ Nothing							
9	Nothing		13.95	1,006			57.75	
10	Dissolved bone black	131	22.57	2,225	10.78	1,475	58.50	6 60
11	Sulphate of ammonia	236	10.83	1,352	-.96	601	55.50	-8 36
12	Muriate of potash	51	10.70	1,183	-1.09	432	58.25	-1 51
13	Nothing		9.63	497			57.50	
14	Land plaster	300	7.25	875	-3.18	-162	56.50	-2 90
15	Lime	300	6.62	803	-3.81	-234	56.50	-3 41
16	Salt	300	19.53	2,095	9.10	1,059	59.25	4 99
17	Nothing		11.23	1,576			57.75	

*The minus sign (—) indicates a loss.

The manure returned a profit in this series, but in most cases the use of commercial fertilizers proved unprofitable. It is interesting to note that wherever sulphate of ammonia was used a loss resulted. This is partly due to the greater cost of the nitrogenous fertilizer, and partly to late growth, and consequent rusting, of the straw, which not only reduced the yield, but also prevented the proper filling of the grain.

The average results of the fertilizers on the two wheat crops grown in Series IV are given in the table below:

TABLE XIII.—AVERAGE INCREASE AND PROFIT FROM FERTILIZATION—
SERIES IV.

No. of Plat.	FERTILIZATION.	Average Number Pounds Fertil- izer.	AV. INCREASE.		Average Weight per Bushel.	Average Net Pro- fit or Loss. \$ Cts.
			Bushels Grain.	Pounds Straw.		
1	Nothing				61.00	
2	Horse manure.	10,000	8.56	1,472	63.75	2.09
3	Cattle manure.	15,000	4.46	2,581	61.38	-1.30
4	Dissolved bone-black.	131	5.19	2,036	60.67	-5.82
	Sulphate of ammonia.	236				
	Muriate of potash.	51				
5	Nothing				61.09	
6	Dissolved bone-black.	131	2.93	1,462	60.50	-4.43
	Sulphate of ammonia.	236				
	Dissolved bone black.	131				
7	Muriate of potash.	51	7.49	1,160	63.00	3.16
	Sulphate of ammonia.	236				
	Muriate of potash.	51				
8	Sulphate of ammonia.	236	0.60	1,433	60.25	-7.63
	Muriate of potash.	51				
	Nothing					
9	Nothing				61.50	
10	Dissolved bone black.	131	8.38	1,384	62.08	5.00
	Sulphate of ammonia.	236				
	Muriate of potash.	51				
11	Nothing				60.04	
12	Land plaster	300	-2.09	-203	61.25	-2.61
13	Lime	300	-2.49	-207	61.13	-2.95
14	Salt	300	4.93	732	60.88	2.91
15	Nothing				60.88	

*The minus (—) sign indicates a loss.

A study of the tables shows (1) that Series IV has been more heavily fertilized than Series I and III, and (2) that the profits are less. This means, evidently, that the amounts of manure and fertilizer applied to Series IV have been too large to be profitable.

In explanation of the heavy fertilization of Series IV, it should be stated that the experiment was planned to return to the land all the plant-food that maximum crops would remove. The results obtained show such complete returns of plant-food to be unprofitable. Notwithstanding the heavy applications, we find (1) that the horse manure returns a small profit, and (2) that the dissolved bone-black returns a profit when used alone or in connection with potash. Muriate of potash (when used alone), and plaster and lime, all seem to have acted injuriously, as indicated by the reduced yields of both grain and straw. Common salt (not fertilizer salt), on the other hand, has returned a small profit.

The profits shown in the preceding tables only indicate the *relative* profitability of growing wheat with and without fertilizers under the conditions named. They do not at all settle the question, "Is wheat grown with fertilizers profitable under existing conditions?" The profitability of wheat culture depends on numerous factors

not included in the foregoing experiments. The experiments *do* emphasize the importance of properly caring for the soil, and they show clearly that, if *judiciously applied*, fertilizers may be used with profit in wheat growing.

SUMMARY.

1. Wheats have maintained their standard of excellence as to yield in the same soil for thirteen years.
2. New varieties of wheat frequently show no improvement over standard sorts.
3. Thick seeding has proved advantageous in a trial covering twelve years.
4. Change of soil has not thus far proved beneficial to an appreciable extent.
5. The best yields and plumpest wheat have usually been obtained by harvesting when the wheat is nearly ripe.
6. Experiments with deep and shallow plowing are not decisive as yet.
7. Phosphatic marl was used in 1895-96 without effect on yield of wheat.
8. The use of fresh horse manure on wheat has generally returned a profit.
9. Complete commercial fertilizers have been used with profit on wheat in some cases.
10. Partial fertilizers (except dissolved bone-black) have not been found profitable on wheat.
11. Heavy applications of manure and complete fertilizers have proved unprofitable, while smaller doses have usually made profitable returns.

BULLETIN No. 62, VOL. VII, OCTOBER, 1896.



THE UDDER OF THE COW.

BY C. S. PLUMB.

INTRODUCTORY.—The process of milk secretion is not entirely understood by physiologists, yet we have a certain amount of information concerning it that may be assumed to be reasonably correct.

The udder of the cow consists of two glands which lie horizontally side by

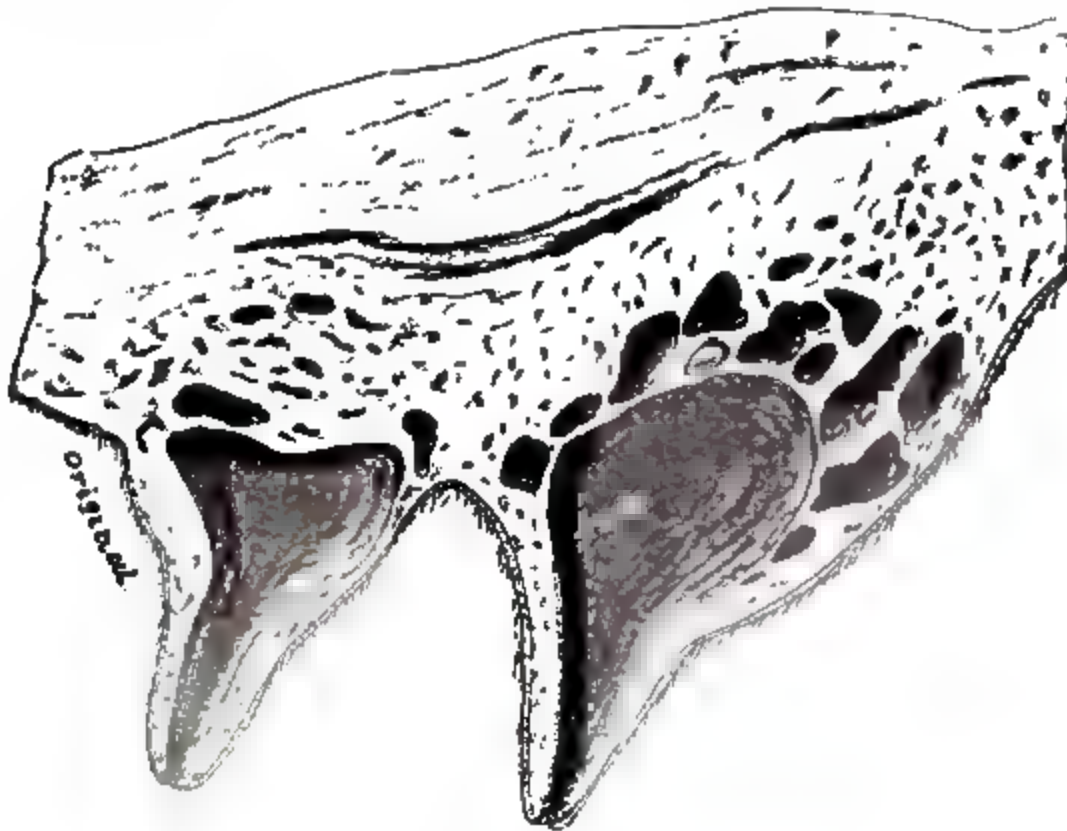


Fig. 32. Section of Gland.

side, separated by a layer of tissue which assists in supporting them. These glands are distinctly separate from each other. This may be noted by examining the under side of udder, where a furrow separating them will be found. The depth of this furrow varies. In some cows where it is quite deep, a badly divided udder results.

Each gland ordinarily has two teats on its lower side, through which the milk is drawn from the gland. Each of the four teats is supposed to draw the milk from what is usually termed a "quarter" of the udder. As the glands are independent of each other, so also, in a measure, are the quarters. This is often demonstrated in a practical way by the farmer, who, for some reason, draws bloody milk from one quarter, while from the adjoining one of the same gland apparently perfectly normal milk is drawn. Cows also suffer from garget in one quarter, while the other three milk freely and appear entirely healthy. One-half or one-fourth of an udder may be completely dry in the fullest flow of the milking period, while the other half or three-quarters are yielding a copious supply of milk.

Dissecting an udder, we find that it is somewhat spongy and pinkish-white in appearance, being permeated with numerous holes or canals much like a sponge. (See Fig. 32.) When cut, more or less milk escapes from the incision. Above each teat is cavity, known as the milk cistern or milk reservoir, from which the milk is drawn through the teats. The two large cavities shown above the teats in Fig 32, are the milk reservoirs. At the lower end of each teat, a small muscle (the sphincter) encircles the outlet with enough force to ordinarily prevent the escape of milk, unless the milking operation is engaged in.

Each gland of the udder is composed of a quantity of structures known as lobes, lobules and alveoli. These may be likened to a bunch of grapes, the lobe representing the bunch, the lobule one grape and the alveoli (Fig. 34), smaller glands or ducts within the one fruit. The alveoli are exceedingly small and can be seen only under a microscope of high power.

The alveoli are provided with epithelial cells from which the milk is produced. The process of milk secretion is two-fold. One is the shedding of the cells in the alveoli which form the fat of the milk. The other is purely a secretive process, by which the water, proteids, salts, etc., are produced in the cells, much as saliva is formed in the salivary glands.

The fluid finds its way through channels from the alveoli into the lobules, from there into the lobes and thence into the smaller orifices seen in the udder when cut open, from which it is conveyed into the milk cistern.

The nervous system of the cow is intimately associated with the production of milk. Very productive milkers, as a rule, show a more pronounced nervous temperament than do animals of the beef type that secrete very much less milk.

Roehrig has given special attention to the relationship of the nervous system to the mammary gland.† According to this authority, a nerve starts from the spinal cord at the lower part of the loins, and divides in the pelvis into three

* F. Smith: *Manual of Veterinary Physiology*, second edition, p. 534.

† R. Meade Smith, "Physiology of the Domestic Animals," 1890, p. 629.

branches. One branch is distributed among the muscles of the abdomen, while the other two become distributed throughout the udder. In this latter organ the nerves are divided so that one branch is associated with the test, another with the milk cistern, while a third permeates the lobules and alveoli.

When the tests are worked with the hands the nerves surrounding them become irritated, and through these the nerves of the secreting glands within the

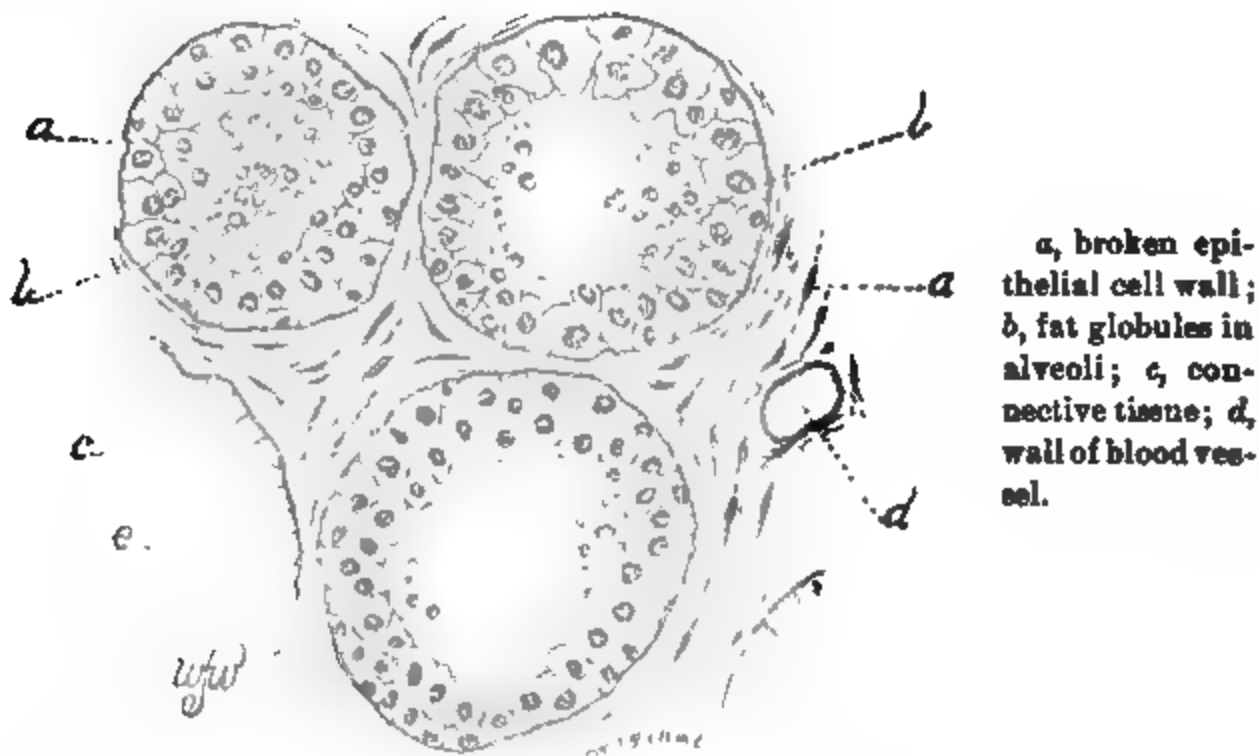


Fig. 34. Alveoli.

udder are excited, causing their contraction and the discharge of their contents. Although no more milk may be actually formed, there is an increase in the amount poured out, due to the contraction of the walls of the glands or milk ducts.

The action of the blood vessels and veins is affected by the activity of the nerves. Through nerve suppression or stimulation the blood current may be reduced or increased in force. This is due to the constriction or expansion of the blood vessels supplying the gland.

The greater the capacity of the arteries and veins connected with the udder, the larger the milk secretion will usually be. According to Smith,* "as far as we know, the mammary secretion is dependent upon the amount of blood passing through the glands. Changes in the general blood pressure, by modifying the blood supply of the mammary gland, also influences the amount of milk secreted."

In view of this, one may appreciate the importance of securing cows with a strong development of the arteries or veins of the udder and abdomen. An examination of the belly of an average cow that is producing milk will reveal thereon,

*"Physiology of Domestic Animals," 1890, p. 631.

extending from the udder along each side, a milk vein about one-half inch in diameter. These milk veins, at the point most distant from the udder, pass through what are called the milk wells in the walls of the abdomen. These orifices, through which the veins pass, should be of good size, thus permitting a strong flow of blood through them. As a rule, the greater the milk-secreting power of the cow, the larger and more twisted of outline will these veins be. In such a case the cow may have three large veins, the third being a shorter one between the outer two, and branching over the udder and on the belly immediately in front of the former may be found quite a number of very pronounced smaller veins. These veins extend in no definite direction, being usually very irregular and somewhat knotted. The development of these blood vessels becomes most pronounced with age, although there is a noticeable difference in their size and extent in young heifers. The writer has seen cows with remarkably large, long, elastic veins, which extended from the udder and disappeared high in the arm-pit at the front leg. Such veins may measure an inch in diameter, and on compression with the fingers exhibit great elasticity.

Writing of the milk vein nearly twenty-five years ago, Hazard stated that if large and tortuous, with a considerable opening through the muscles of the belly to admit of its passage outwards, it is frequently connected with a rich udder; but far greater reliance can be placed on the network of veins seen beneath the skin over the forequarters of the udder. This characteristic is little noticed by authors, and I have rarely heard dairymen or dealers in cattle speak of it. But both the veins and the udder itself, and those which pass upwards behind towards the tail, when large, are sure tests of a competent milker. Magne has noticed this mark more than other persons, though our own observations, which agree with Professor Magne's, date several years back.*

Persons familiar with milch cows are aware that they differ widely in the character of the udder or mammary gland. This variability may be expressed by the following terms: Large, small, conspicuous, inconspicuous, elastic, pliable, meaty or fat, narrow, broad, deep, pendant, shallow, long, short, well balanced, poorly balanced, square, blocky, funnel shaped, etc. It has been the observation of the writer that but comparatively few persons pay much heed to the external appearance or "feel" of the udder, when purchasing a cow. While with dairy breeds of cattle the udder and its contents are the principal things to be sought for, some other quality too often influences the purchaser to buy, such as size of body, future salability from the beef standpoint, prettiness, fancy points, pedigree, disposition, etc.

In consulting literature, one finds comparatively little published on the subject of the udder itself or the milk veins. Several cattle associations publish descriptions and scales of points of what they regard as model udders of the breeds whose interests they represent. Animal physiologies describe the udder and the function

*"The Jersey, Alderney and Guernsey Cow," Philadelphia, 1872, p. 71.

of milk secretion. Agricultural or live stock papers discuss, more or less, the



Fig. 35. Well Balanced Udder.

characteristics of the dairy cow, as relates to conformation, temperament, etc. These are all very well so far as they go, but it has seemed to the writer for some time that we have needed more specific information concerning this mammary gland. Our intelligent breeders and feeders are already exacting from their cows at least a certain yield of milk per year of a quality that will assure them a profit in their keeping. There are persons owning herds where no cows are maintained that produce less than a standard number of pounds of milk or butter (or butter fat) in a year. The use of the scales and the Babcock Milk Fat Testing Machine has largely assisted in weeding out the un-

profitable animals in many herds. These two instruments are most important accessories in progressive dairy farming, and much practical and experimental work has already been done with their assistance.

In certain other directions, however, there is a good field for improvement and experimentation. An examination of a herd of 100 dairy cows will show but few udders of an ideal type. No such irregularity of form is presented by any other part of the animal anatomy among horses, cattle, sheep and swine, as among the mammary glands of dairy cows. In view of this fact, the subject of the relationship of the udder form to milk production is of importance.

What relationship has the shape of the udder to its producing capacity? In the brief descriptions of the model udder given in describing cows, it is usually specified that it shall be blocky or square, and extend along the belly and be carried well up behind. That will do, perhaps, so far as it goes, but that is not enough.

A good type of an udder, in its side outline, will very nearly have the curve of a part of a circle (Fig. 35). If it is a fine udder, it will be carried beyond the lines of the circle by an extension along the belly and well up behind toward the vulva. Such an udder, with four teats about three and one-half inches long, well placed under each quarter and not crowded, makes the very best type obtainable, as viewed from one side. Examined from the rear or front, there should be considerable thickness, while viewed from below, the furrow separating the two glands should not be too deep. With these qualities, should be secured great elasticity of tissue when the glands are emptied. The so-called meaty udder always looks too plump after being emptied, while the elastic one, following this operation, shows a well shrunken or shrivelled condition.

COMPARISON OF FRONT HALF AND HIND HALF OF THE UDDER.

The most common fault of the cow's udder, as commonly seen, is its inferior development in front. Often the hind part is well rounded out and carried well up behind, while the fore-quarters are small and poorly developed, and instead of being carried forward a distance along the line of a circle, the front line is carried up to the belly quite vertically, as it were. While quite generally the fore teats hang on a little higher line than those behind, when the fore-quarters are inferior in character, sometimes these teats are so much higher than the hind ones that the udder seems to terminate with the front line of the teats.

In order to get some specific information as to the yield of the front and hind parts of the udder, the milk-yield of these parts with quite a number of cows with different types of udder was taken. Nearly all of these animals were milked under the writer's supervision. The records were obtained from cows belonging to Purdue University; W. H. LaGrange & Son, Franklin, Ind., Holstein breeders; Ohio State University, Columbus, Ohio; J. T. Polk, Greenwood, Ind., Jersey breeders; L. W. Kieffer, Lafayette, Ind., dairyman; to all of whom I am under special obligations for generously placing their herds at my disposal for experimental work.

The milk from each cow was drawn into two different pails. Realizing the inferior size of the fore-part, in order to give this the benefit of any increase in weight through first milking, this part was first milked into one pail. The hind part was then milked into the other pail, after which the fore part was again stripped into pail one, followed by the stripping of the hind part into pail two. The weighing of each milking was witnessed by two or more persons.

While a great number of figures, as a rule, are tiresome to the average reader, the writer has thought that the weighings of these milkings might be of more than common



Fig. 36. Poor-Front.

interest to many owners of dairy cattle, to show the wide variation in yield of parts, and so the entire record is published. Some of these figures will be referred to further on.

No.	NAME OF COW.	BREED.	MILK YIELD.			
			Forepart.		Hindpart.	
			Lbs.	Ozs.	Lbs.	Ozs.
1	Granny	Grade Shorthorn	4	1	5	13
2	Jersey	Grade Jersey	3	1	2	8
3	Mae	Grade Shorthorn	4	4	6	12
4	No Name	Grade Shorthorn	4	13	7	0
5	Blue Bird	Grade Shorthorn	3	4	3	7
6	Coleman	Grade Shorthorn	7	4	7	5
7	Baker	Grade Shorthorn	3	6	6	4
8	No. 2	Grade Shorthorn	3	10	4	13
9	Fannie Airdrie 7th	Grade Shorthorn	3	5	4	12
10	Fannie Airdrie 7th	Grade Shorthorn	4	4	6	8
11	Fannie Airdrie 7th	Grade Shorthorn	3	4	4	4
12	Fannie Airdrie 7th	Grade Shorthorn	4	2	6	6
13	Fannie Airdrie 7th	Grade Shorthorn	3	4	4	4
14	Jewel of St. Lambert	Jersey	2	8	2	8
15	Jewel of St. Lambert	Jersey	3	2	3	5
16	Jewel of St. Lambert	Jersey	2	8	2	6
17	Jewel of St. Lambert	Jersey	3	2	3	2
18	Manada Purdue	Holstein	5	14	8	13
19	Manada Purdue	Holstein	6	13	10	2
20	Manada Purdue	Holstein	7	2	10	0
21	Manada Purdue	Holstein	5	13	8	9
22	Manada's Girl	Holstein	6	12	6	4
23	Manada's Girl	Holstein	5	2	6	2
24	Manada's Girl	Holstein	6	8	6	6
25	Manada's Girl	Holstein	5	14	5	14
26	Nigger (a)	Holstein	2	8	3	9
27	Nigger (a)	Holstein	3	0	4	4
28	Sara Purdue	Holstein	8	12	9	12
29	Sara Purdue	Holstein	9	0	9	4
30	Early Morn	Jersey	6	14	9	4
31	Early Morn	Jersey	5	12	7	5
32	Early Morn	Jersey	5	4	7	5
33	Early Morn	Jersey	7	5	9	2
34	Devil Bacon	Jersey	0	9	1	6
35	No. 29	Jersey	6	0	5	9
36	No. 44	Shorthorn grade	5	13	5	0
37	No. 53	Shorthorn grade	2	12	4	6
38	No. 48	Shorthorn grade	2	2	4	4
39	No. 13	Shorthorn grade	4	13	6	13
40	Jeddine	Holstein	2	8	4	12
41	Sabta	Holstein	3	8	3	13
42	Sabta	Holstein	2	0	5	0
43	Cherry	Holstein	3	4	6	8
44	Cherry	Holstein	2	0	4	0
45	Luthilde	Holstein	5	0	5	0
46	Luthilde	Holstein	4	0	5	0
47	Omega Zwaart	Holstein	5	12	8	4
48	Omega Zwaart	Holstein	4	8	6	0
49	Lena Zwaart	Holstein	4	8	4	12
50	Lena Zwaart	Holstein	3	0	4	8
51	Kathleen	Holstein	7	0	9	8
52	Kathleen	Holstein	5	4	7	8
53	Nigger (b)	Holstein	4	8	3	0
54	Nigger (b)	Holstein	3	4	3	0
55	Grade Jersey	Jersey	1	4	1	12
56	Grade Jersey	Jersey	2	0	2	0
57	Jelly Queen	Holstein	4	12	4	4
58	Jelly Queen	Holstein	4	8	3	8
59	Cathrene	Holstein	8	8	9	8
60	Cathrene	Holstein	6	4	8	0
61	Cathrene	Holstein	9	0	9	8
62	Rose	Holstein	3	8	4	8
63	Queen	Holstein	5	4	4	13
64	Queen	Holstein	6	0	6	4
65	Delaware Castine	Holstein	4	4	5	12
66	Doubt DeVries	Holstein	4	4	5	8
67	Daisy Pinterije Burke	Holstein	4	0	6	4

No.	NAME OF COW.	BREED.	MILK YIELD.			
			Forepart.		Hindpart.	
			Lbs.	Ozs.	Lbs.	Ozs.
68	Starlight	Holstein	6	0	6	0
69	Polly	Holstein	3	12	4	4
70	Ward's Manje's 7th Empress	Holstein	7	4	8	12
71	Rubano's Lady	Jersey	1	7	2	8
72	Rubano's Lady	Jersey	1	13	3	4
73	Signal's Anna	Jersey	5	9	6	10
74	Signal's Anna	Jersey	7	0	8	5
75	Topsy's Signal Pogis	Jersey	3	12	7	5
76	Topsy's Signal Pogis	Jersey	5	3	9	13
77	Amy Rosedew	Jersey	4	4	4	7
78	Fairy of Hunting Hill	Jersey	1	3	3	14
79	Fairy of Hunting Hill	Jersey	1	12	5	4
80	Emogene 4th	Jersey	2	10	2	7
81	Emogene 4th	Jersey	4	2	4	13
82	Peaches 5th	Jersey	2	11	3	11
83	Mamie Burns	Jersey	4	0	4	4
84	Mamie Burns	Jersey	5	13	5	5
85	Royal Pogis Lady	Jersey	3	7	2	10
86	Royal Pogis Lady	Jersey	4	9	3	15
87	Primrose of Elmhurst	Jersey	2	10	3	5
88	Primrose of Elmhurst	Jersey	3	8	4	3
89	Golden Brownie Girl	Jersey	2	3	2	3
90	Golden Brownie Girl	Jersey	3	3	2	12
91	Belle Miller	Jersey	3	14	6	8
92	Belle Miller	Jersey	4	15	6	13
93	Mamie Gay	Jersey	2	7	3	5
94	Mamie Gay	Jersey	3	10	4	11
95	Toltec's Jeanette	Jersey	2	12	4	1
96	Toltec's Jeanette	Jersey	4	0	5	9
97	Little Picture	Jersey	2	14	3	0
98	Preletta	Jersey	5	14	5	14
99	Preletta	Jersey	6	13	6	13
100	Broadtrut	Jersey	1	15	2	8
101	Broadtrut	Jersey	3	3	3	5
102	Gussie Summers	Jersey	1	10	3	8
103	Gussie Summers	Jersey	2	5	5	0
104	Ida's Countess 2nd	Jersey	3	11	5	9
105	Ida's Countess 2nd	Jersey	5	6	7	5
106	Mose	Jersey	2	9	4	5
107	Mose	Jersey	2	15	5	7
108	Betsy Bella	Jersey	2	3	3	2
109	Betsy Bella	Jersey	3	5	4	6
110	June	Jersey	3	8	4	4
111	Lucilina	Jersey	3	3	4	3
112	Butterfly's Delight	Jersey	2	6	3	12
113	Pogis Selga	Jersey	4	9	6	5
Total weight			474	10	553	0
Average			4.1		4.9	

The above figures are of 226 different lots of milk, of two classes, from sixty-five different cows, representing several types of udders. They are all classed together, however, to show the tendency for the average hind udder to produce more than the fore part. These cows, in 113 milkings, produced 474 pounds 10 ounces milk from the fore part, and 553 pounds from the hind part, a difference in favor of the latter of 78 pounds 6 ounces, a gain of 16½ per cent., a no inconsiderable amount.

NAME OF COW.	YIELD FORE UDDER.		YIELD HIND UDDER.	
	Lbs.	Ozs.	Lbs.	Ozs.
Blue Bird	3	4	3	7
Broadtrut	3	3	3	5
Broadtrut	1	15	2	6
Coleman	7	4	7	5
Jewel of St. Lambert	2	8	2	6
Jewel of St. Lambert	3	2	3	5
Jewel of St. Lambert	2	8	2	6
Jewel of St. Lambert	3	2	3	2
Little Picture	2	14	3	0
Manada's Girl	6	12	6	4
Manada's Girl	5	3	5	2
Manada's Girl	6	8	6	5
Manada's Girl	6	14	5	14
Peggy Selga	4	9	6	5
Preletta	5	14	5	14
Preletta	6	13	6	13
Sara Purdue	8	12	9	12
Sara Purdue	9	0	9	4
Total yield	89	0	92	7
Average yield	4.9	.	5.1	...



Fig. 38. Well developed front.

Here the difference in yield of the two parts is comparatively small, averaging only 0.2 pounds per day. It is important to note here, however, that not infrequently where the udder is well developed in front, the hind is carried out and up so high that the front part produces a notably less amount than the other part. This is illustrated in the case of the cow "Early Morn," whose front udder is exceptionally well developed, as shown in Fig. 38. Her hind udder, however, is very elastic, and usually yields more than the front part. This is shown in the following figures, representing four different milkings:

COW "EARLY MORN."	YIELD FORE PART.	YIELD HIND PART.
First milking	6.9 pounds.	9.2 pounds.
Second milking	6.7 pounds.	7.3 pounds.
Third milking	5.2 pounds.	7.3 pounds.
Fourth milking	7.3 pounds.	9.1 pounds.
Total	25.1 pounds.	32.9 pounds.

The second and third milkings represent night yields, which, as a rule, are smaller than those of the morning. The writer secured a number of other records from cows having well-developed fore udders that were similar to that of "Early Morn." It is to be noted, however, that the udder which is well developed in front and behind, more often than not, yields an amount of milk from each part different only in a slight degree in amount.

The practical bearing of this matter lies here: The average cow has an inferior udder, and notably in its fore part. If now a judicious selection is practiced in breeding, may not a material gain in milk-flow be secured by developing the fore part of the udder? It will be safe to say that there will be. The greater the development of the fore udder the more perfect will the entire organ be likely to be, and the larger the relative amount of milk it will yield.

To secure such a development, more care will have to be exercised in the selection of our cows in relation to the mammary gland. While constitutional vigor and digestive capacity should always receive first consideration, the breeder of dairy cattle can not afford to breed inferior udders any more than can a breeder

of trotters afford to breed slow-gaited animals for a fast track.

There is much in heredity. A cow with a finely-developed mammary gland will be likely to transmit it to her offspring if she is properly mated. This is well illustrated in Figs. 38 and 39, showing the udders of "Early Morn" and "Early Morn 2d," mother and daughter. Not only do these two animals much resemble each other in physical conformation, but their udders are also much of the same type, as shown in the illustrations.

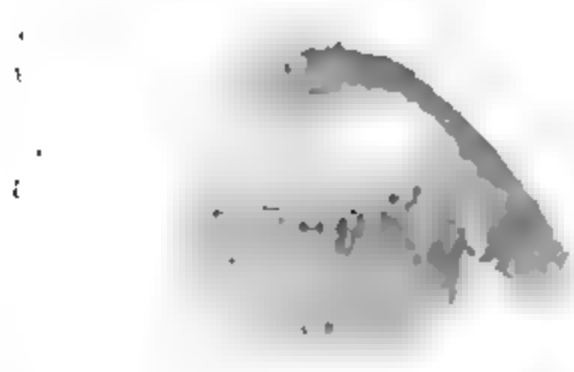


Fig. 39.

TYPES OF UDDERS.

An examination of many cows will show several distinct types of udders. Fig. 35 is an excellent type of the *pendant form*, in which the gland without the body nearly follows the arc of a circle. An excellent view is also given of the large right milk vein. Fig. 38, of the udder of "Early Morn," shows an unusually fine fore udder, this part curving well beyond the arc of the circle along the belly. Fig. 39 is of "Early Morn 2d," and represents the same general conformation, but being only a heifer, the udder is less developed than is the mother's.

Fig. 41 shows a good udder, yet with the front part slightly within the arc of the circle. Even this, however, is better than that ordinarily found in a large

herd. The most common type to be found is the funnel-shaped pendant form, shown in Fig. 37, or one after the same style, only with the front part very deficient, with the teats much elevated above those behind, as shown in Fig. 35. The reader will observe in Fig. 37 that the line of the udder comes very much within the line of a circle, extending almost vertically from the teat to the belly.

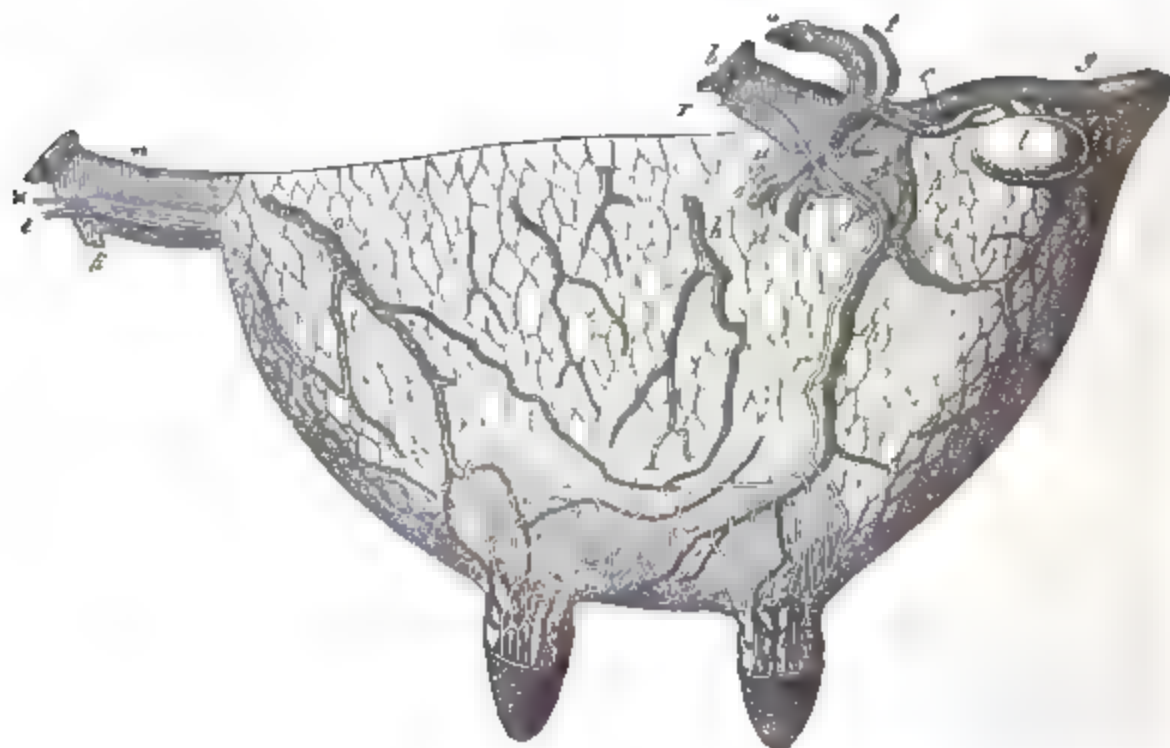


Fig. 40.

Cow's UDDER (after Fuerstenberg).—The left side of the udder of a Dutch cow. The skin has been removed to show the course of the superficial arteries and veins, as also the lymphatic vessels and nerves. *a*, External pudic artery; *b*, external pudic vein; *c*, branch of artery supplying the posterior part of milk gland, the lymphatic gland, etc.; *d*, posterior mammary artery, posterior artery of the milk gland; *e*, continuation of external pudic artery, ending in the skin and subcutaneous connective tissue near the breast bone; *f*, large vein from posterior part of mammary gland, from the lymphatic gland, the pudenda, etc.; *h*, posterior mammary vein; *i*, lymphatic gland, situated on the posterior outer surface of the mammary gland; *m*, peritoneal or milk vein (*vena subcutanea abdominis*); *o*, anterior mammary vein; *r*, a lymphatic vessel receiving part of the superficial mammary lymphatics; *t*, mammary nerve formed by the union of the posterior branch of the iliac nerve (*nervus ilio-hypogastricus*) and a branch of the external spermatic nerve; *u*, posterior division of this nerve; *x*, continuation of *t*, ending in the skin at the navel.

YIELD OF THE RIGHT AND LEFT GLAND.

As has already been stated, the udder is composed of two separate glands which lie along side of each other, separated by a wall of fibrous tissue. As a matter of interest, an investigation was undertaken to ascertain if the two glands yielded differently in amounts of milk. So far as the writer knows, the cows in this experiment, herewith reported on, have perfectly normal udders. The results

of this test are shown in the table below. In connection with this work, samples were taken from each lot of milk, and the per cent. of fat measured by the Babcock method.

NAMES OF COWS.		MILKED IN MORNING.						MILKED IN EVENING.					
		Left Gland Milked First.			Right Gland Milked Last.			Right Gland Milked First.			Left Gland Milked Last.		
		Lbs.	Ozs.	% Fat.	Lbs.	Ozs.	% Fat.	Lbs.	Ozs.	% Fat.	Lbs.	Ozs.	% Fat.
Early Morn,	1st	3	2	7.1	3	12	7.2	3	2	6	2	15	6
"	2d	2	9	8.3	2	15	7.8	2	9	7.1	1	13	8.8
"	3d	11	11	8.1	3	3	8	2	6	7.5	2	1	7.3
Early Morn, 2d,	1st	1	13	7.4	1	13	7.3	1	8	7.4	1	7	7.3
"	2d	1	11	7.7	1	11	7.8	1	6	7.5	1	8	7.3
"	3d	1	10	8	1	10	7.7	1	6	8	1	3	7.4
Edgewood Queen,	1st	4	2	6.8	3	14	6.5	3	2	6	2	15	6
"	2d	3	3	6.5	3	15	5.5	3	2	6.2	2	12	5.5
"	3d	3	15	5.8	3	13	5.1	2	13	5.3	2	8	5
Nellie Purdue,	1st	3	5	7.8	2	8	5.6	2	11	7.2	3	0	7.3
"	2d	3	3	7.1	2	9	6.3	2	13	8.7	2	9	7.3
"	3d	3	1	6.8	2	8	6.7	2	8	8	2	7	7.5
Sara Purdue, 2d,	1st	9	6	3.4	8	4	2.5	7	5	8	7	2	8
"	2d	8	10	8.7	7	5	3.1	8	1	4.3	6	6	3.1
"	3d	9	3	3.2	7	12	2.7	6	14	3.2	6	5	3
Total yield		51	8		57	8		51	10		46	15	
Average		4.1		6.4	3.9		5.4	3.4		6.3	3.1		6.1

According to these figures, the gland which is milked first, gives slightly more than the one milked last, with a slight increase in fat per cent. in the evening, and a very considerable increase in the fat per cent. in the morning. The total yields, however, of each set of milkings of each gland, do not materially differ, that of the right gland being 109 lbs. 2 ozs., and of the left 108 lbs. 7 ozs., a very considerable amount.

In an address before the agricultural students of the Ohio State University, in February, 1895, the writer gave a set of records of the milk yields from right and left glands of six cows, involving 14 different milkings. In this record, the difference in the total yield from each gland was less than one pound. Seven of the 14 sets of weights were practically the same. At that time no tests for fat per cent. were made. Later and more extensive records secured, however, would indicate that the gland milked first will give slightly more milk with the larger per cent. of fat therein.

EFFECTS OF MILKING ONE TEAT AT A TIME.

When at the New York State Experiment Station, Dr. E. L. Sturtevant, the director, had the different quarters of the udder of a cow milked separately a number of times, and the milk weighed and the total solids and fat determined. The result of this study led him to come to the conclusion that there was a marked difference in the quality of milk from the different quarters of the udder, Dr. S. M. Babcock, who was then chemist of the New York Station, made the determinations of fat and solids. At a later date, on becoming chemist of the Wisconsin Station, Dr. Babcock repeated Dr. Sturtevant's experiment a number of times.* At each milking the teats were milked in different order. If *A* represents the right fore teat, *B* the right hind teat, *C* the left hind teat and *D* the left fore teat, then they were first milked in this order. The next milking began with *B* and ended with *A*, in order, and so on. Briefly stated, "the result of any single milking fully confirms those of Dr. Sturtevant, and shows a decided difference in the quality of milk from the different teats; if, however, the whole series be considered, it is evident that the order in which the teats were milked is the chief factor which affects the quality of the milk. If we arrange them in the order in which the milkings were richest, we find that the second is the best in quality, the first the second best, the third the third best and the fourth the poorest. If, however, we take the average for each teat for the first four milkings, independent of the order of milking, we find that so much of the difference had disappeared that it is doubtful about there being any difference in the physiological functions of the different quarters of the udder."



Fig. 42. Section through half lobule.

a, duct dividing into two branches; *b, b, b*, connective tissue surrounding and going between the pouches of the gland; *c, c, c*, the pouches or alveoli of the gland, the dots representing the cells lining them. (After Klein, *Atlas of Histology*, Plate 40, Fig. I)

With a desire to secure additional evidence along this same line, the writer had a test made with four cows in the station herd, which included four successive milkings. The arrangement of the teats may be designated as given above in Dr. Babcock's work: *A* the right fore, *B* the right hind, *C* the left hind and *D* the left fore.

The following table gives the records of the four cows:

*Sixth annual report Wisconsin Experiment Station, 1890, p. 44.

NAME OF COW.	PERIOD OF MILKING.	FIRST MILKED.						SECOND MILKED.						THIRD MILKED.						FOURTH MILKED.					
		1 st Milking			2 nd Milking			1 st Milking			2 nd Milking			1 st Milking			2 nd Milking			1 st Milking			2 nd Milking		
		Lbs.	Fat.	%	Lbs.	Fat.	%	Lbs.	Fat.	%	Lbs.	Fat.	%	Lbs.	Fat.	%	Lbs.	Fat.	%	Lbs.	Fat.	%	Lbs.	Fat.	%
Edgewood Queen.	First.	1.2	5.4	.064	1.8	5.4	.097	1.8	5.4	.097	1.7	5.5	.093	1.3	6	.078	1.3	6	.078	1.3	6	.078	1.3	6	.078
	Second.	2.7	4.8	.129	2.6	5.5	.130	2.6	5.5	.130	1.3	4.9	.063	1.6	4.1	.065	1.6	4.1	.065	1.6	4.1	.065	1.6	4.1	.065
	Third.	1	6.1	.061	1.5	6.3	.094	1.5	6.3	.094	1.5	6.2	.093	1.5	5.4	.102	1.9	5.4	.102	1.9	5.4	.102	1.9	5.4	.102
	Fourth.	1.4	7	.098	1.7	6.2	.105	1.7	6.2	.105	2.5	5.2	.130	2.3	5.1	.117	2.3	5.1	.117	2.3	5.1	.117	2.3	5.1	.117
Early Morn.	First.	1.3	6.4	.083	1	4.7	.047	1	4.7	.047	.9	5.2	.046	.7	4.8	.083	.7	4.8	.083	.7	4.8	.083	.7	4.8	.083
	Second.	2	6.4	.128	1.7	6.6	.112	1.7	6.6	.112	1.6	6.2	.099	1.7	5.6	.096	1.7	5.6	.096	1.7	5.6	.096	1.7	5.6	.096
	Third.	1.7	8.5	.144	1.5	9.2	.138	1.5	9.2	.138	1.3	9.8	.127	1.6	9.2	.147	1.6	9.2	.147	1.6	9.2	.147	1.6	9.2	.147
	Fourth.	1.5	6.1	.091	1.5	6.4	.096	1.5	6.4	.096	1.6	6.8	.108	1.4	6.3	.088	1.4	6.3	.088	1.4	6.3	.088	1.4	6.3	.088
Early Morn, 2d.	First. . . . .	.7	6.4	.014	.6	6.4	.038	.6	6.4	.038	.5	5	.025	.6	5.8	.034	.6	5.8	.034	.6	5.8	.034	.6	5.8	.034
	Second.	1.1	6.4	.070	1	6.3	.063	1	6.3	.063	1	4.6	.046	.8	4	.032	.8	4	.032	.8	4	.032	.8	4	.032
	Third. . . . .	.7	8.8	.061	1	8.4	.084	1	8.4	.084	.9	6.4	.057	.6	4.8	.028	.6	4.8	.028	.6	4.8	.028	.6	4.8	.028
	Fourth.	1	7.4	.074	1	8.1	.081	1	8.1	.081	1	6.7	.067	.7	5	.035	.7	5	.035	.7	5	.035	.7	5	.035
Sara Purdue, 2d	First.	2.5	2.8	.070	4	3	.120	4	3	.120	2.9	3	.087	4.2	3.3	.138	4.2	3.3	.138	4.2	3.3	.138	4.2	3.3	.138
	Second.	5.6	3	.068	5.4	2.8	.151	5.4	2.8	.151	3.6	2.5	.090	3.8	2.5	.095	3.8	2.5	.095	3.8	2.5	.095	3.8	2.5	.095
	Third.	4	4.5	.180	2.5	4.1	.102	2.5	4.1	.102	2.5	3.6	.090	2.9	4.3	.124	2.9	4.3	.124	2.9	4.3	.124	2.9	4.3	.124
	Fourth.	2.5	3.8	.085	2.6	3.5	.091	2.6	3.5	.091	3.6	3	.108	3	2.9	.067	3	2.9	.067	3	2.9	.067	3	2.9	.067
AVERAGES OF ABOVE.																									
Edgewood Queen		1.57	5.8	.088	1.90	5.7	.106	1.90	5.7	.106	1.75	5.4	.094	1.77	5.1	.090	1.77	5.1	.090	1.77	5.1	.090	1.77	5.1	.090
Early Morn.		1.62	6.8	.111	1.42	6.7	.098	1.42	6.7	.098	1.35	7.0	.095	1.35	6.4	.090	1.35	6.4	.090	1.35	6.4	.090	1.35	6.4	.090
Early Morn, 2d . . . . .		.84	7.2	.062	.90	7.3	.088	.90	7.3	.088	.85	5.6	.048	.67	4.9	.082	.67	4.9	.082	.67	4.9	.082	.67	4.9	.082
Sara Purdue, 2d.		3.45	3.5	.128	3.62	3.3	.116	3.62	3.3	.116	3.15	3	.093	3.47	3.2	.111	3.47	3.2	.111	3.47	3.2	.111	3.47	3.2	.111
Average.		1.87	5.83	.097	1.96	5.75	.096	1.96	5.75	.096	1.77	5.25	.082	1.81	4.90	.080	1.81	4.90	.080	1.81	4.90	.080	1.81	4.90	.080

By an examination of this table the reader will see that the results secured are not in accord with those of Dr. Babcock. The writer fails to note any special influence on either milk yield or butter fat production, as is shown in the dairy records of the several cows. If, however, the average results from each cow are considered, there will be seen to be a tendency to produce milk *slightly* poorer in butter fat, in descending degree, from the first to the fourth quarter milked, although the quantity of milk in the several quarters is not materially affected. If we take the mean of the averages of the four cows then a definite decrease in per cent. and amount of butter fat from the first to the fourth quarter milked is shown. This amount, of course, is small, and it would, in fact, be unsafe to conclude from these figures that there is any material difference in the quality of the milk in the several quarters of the udder, when milked in different order of sequence.

In order to study the results of this experiment from another point of view, all of the first milkings, from each quarter of each cow, were grouped together and the average figures secured. This was also done with the second, third and fourth milkings. The average results thus secured show no special influence on quantity or quality of the milk. Taking the four cows into account it is impossible to arrange the milkings in any special order, showing one quarter to be in sequence richer or poorer in butter fat than another. The average of all the milking of *A* shows 5.46 per cent. butter fat; for *B*, 5.34; for *C*, 5.40, and for *D*, 5.64 per cent.

In conclusion, as stated by Dr. Babcock, "it is doubtful about there being any difference in the physiological functions of the different quarters of the udder."

NOTE: Figs. 33, 40, 42 are reproduced by permission of Macmillan & Co., New York, from 'Milk; Its Nature and Composition,' 1895.

APPENDIX.

A TECHNICAL DESCRIPTION OF THE PROCESS OF MILK SECRETION.

The udder consists of two glands, resting side by side in a horizontal position, separated by a fibrous partition. Each of these glands contains a great number of smaller glands which are designated as lobes, lobules (Figs. 33 and 42) and alveoli (Fig. 34). These vary in size from the lobes, which are the largest, to the alveoli, which are the smallest. Fleischmann gives the size of the alveoli as varying from .0047 to .0078 of an inch in length, and from .0035 to .0043 of an inch in breadth.*

Each of these forms of glands possess excretory ducts, and they connect from the smallest to the largest, and empty into the milk cisterns situated over the teats.

Says Aikman,† "When a duct, therefore, is traced into the glands, it will be found to become subdivided into smaller ducts, and these in their turn into still smaller ones, while around the smallest of the ductlets are clustered several alveoli."

*Aikman; Milk: Its Nature and Composition. 1895.

†Ibid.

The main source of milk production lies in the alveolus. This is surrounded by a structureless membrane, on the inner surface of which are layers of epithelial cells.

In the opinion of some,* there is a net work of lymph vessels on the membrane surrounding the alveolus. Wulff, however, was unable to find these vessels.† Klein states that "each gland alveolus is surrounded by a dense *net work of capillary blood vessels*. The alveoli are surrounded by *lymph spaces* like those in the salivary glands, and these spaces lead into the net work of lymphatic vessels of the interlobular connective tissues‡

The alveoli in an animal that has never been pregnant are smaller and less numerous than with those that have borne young. They are cylindrical, solid, and contain granular appearing polyhedral epithelial cells. At this stage there are relatively few alveoli in the gland, it consisting mainly of fibrous connective tissue. During pregnancy these cells enlarge, elongate, thicken and multiply, owing to the rapid division of the cell constituents. At parturition, the cells of the alveoli are discharged and a single layer of secretory cells forms within the membrane. These cells are to furnish the milk. The first discharged cells supply the colostrum found in the first milk.

Each active cell may produce one or more smaller or larger fat globules. These eventually pass out from the cell protoplasm into the tube or cavity of the alveolus, where they then become milk globules. A continual process of globule reproduction continues while the mammary glands are active. The cell becomes solid, oil globules are formed and then thrown off.

Smith states|| that the appearance presented by the single layer of cells lining the alveolus of the secretory gland, depends upon whether the gland is full or empty. If the latter, and active secretion occurring, the cells are found to be large and columnar in shape, possessing two or more nuclei, one being at the base of the cell and the other giving indications of degeneration, placed near the apex. In the apex or free portions of the cell can be seen fat globules, which may even have partly extruded themselves from the cell, and besides these there are other particles.

An examination of an empty gland, after the milk is discharged, shows the cells of the alveolus to be cubical or flattened, and the lumen enlarged and containing some of the elements of the milk. Smith further considers¶ that much of the material with which the alveolus is loaded is fat, being the product of cell secretion, while the proteids, sugar and salts are secreted in the ordinary way from the lymph circulating in the gland, the cells lining the alveolus being the active factor in the matter. The fact that neither casein nor milk sugar exists in any other tissue of the body, would seem to demonstrate that these are elaborated in the alveolus.

Smith considers the origin of milk sugar less clearly established than that of the casein, though probably occurring through changes in the protoplasmic con-

*Rauber; Ueber den Ursprung der Milch. Klein; Elements of Histology, 1892.

†Bulletin 24, Indiana Agricultural Experiment Station. May, 1889.

‡Elements of Histology; 1892, p. 288.

||Manual of Veterinary Physiology, 2d edition.

¶Ibid.

tents of the epithelial cells of the gland.* The amount of sugar in the milk is entirely independent of the amount of carbohydrates in the food, and remains unchanged, even when animals are fed on a purely milk diet.

According to Schmidt,† the epithelial cells of the alveolus, after having secreted milk globules for some time, finally break up and are replaced by new epithelial cells derived by the division of the other still active epithelial cell.

Klein regards each milk globule as an oil globule, surrounded by a thin albuminous envelope known as "Ascherson's membrane."

BULLETIN No. 63, VOL. VII.

DECEMBER 1896.

BOVINE TUBERCULOSIS IN INDIANA.

BY A. W. BITTING, D. V. M.

DEATH RATE AMONG PEOPLE IN INDIANA.

In 1894, 15,627 people died in this State. One hundred and fifty-three causes are assigned as producing this mortality, among which are tuberculosis, pneumonia, typhoid fever, scarlet fever, diphtheria, la grippe, small-pox, accidents, etc. The relative number of deaths from the causes just mentioned is as follows:

Tuberculosis	2173	. . . . .	13.9 per cent.
Pneumonia	1040	. . . . .	6.6 per cent.
Typhoid fever	847	. . . . .	5.4 per cent.
Accidents	757	. . . . .	4.8 per cent.
Diphtheria	553	. . . . .	3.55 per cent.
La grippe	397	. . . . .	2.5 per cent.
Scarlet fever	108	. . . . .	0.7 per cent.
Small-pox	26	. . . . .	0.2 per cent.

This shows very strikingly the greater number of deaths due to tuberculosis or consumption than to any other disease. The high tubercular mortality in this

*Physiology of the Domestic Animals.

†Klein; Elements of Histology, 1852.

State is not very different from that in other States or in other countries, some showing a smaller and others a somewhat larger per cent. It is only of recent years that people have begun to realize the high death rate due to this disease. This accounts for the deep interest taken in research which has for its object the lessening of the number of victims. This interest is general and is becoming as widespread as the disease itself. Newspapers have devoted columns to the discussion of measures to be employed to check it. Government sanitary commissions, medical associations, experiment stations and other bodies have employed experts to work upon it, and their reports are scattered broadcast.

It is the object of this bulletin to present in a condensed form the results of recent investigations upon the method of diagnosing the disease, its contagious nature, and such data upon the prevalence of the disease in this State as we have been able to collect.

TERMS APPLIED TO THE DISEASE.

The disease is commonly known as consumption, but sometimes is called phthisis, lupus, wasting disease, scrofula, tabes mesenterica, tubercle, etc. Some of these terms are applied to the disease when it is confined to a particular part, as phthisis when in the lungs, and tabes mesenterica when affecting the intestinal tract. All are due to the same cause.

SPECIES AFFECTED.

The disease affects many species of animals and human beings. Men and cattle seem to be the most often affected, hogs occasionally, horses and sheep rarely. Wild animals confined in menageries are frequently affected. No other disease is known to affect so many species.

DISTRIBUTION.

In its geographical distribution it is not confined to one continent or zone, but is universal. However, the number of cases vary in the different localities.

Great variation may occur in places located only a short distance from one another, as in the smaller cities of France the death rate from this disease is only 1.81 per cent., while in Paris, near by, it is 4.91 per cent. The increase in percentage in that country is found to be in direct ratio to the increase in population. In North Dakota the death rate for the white population is remarkably low, while that among the Indians is very high; this difference is due to the character of the food eaten. Among domestic animals, particularly cattle, we find the variation as great as that among people, as within the same State some localities may have a large number of affected animals, while other places will be free. The geographical and climatic conditions are secondary factors in determining the prevalence of the disease.

MORTALITY FROM TUBERCULOSIS.

Vital statistics show that the mortality from this disease far exceeds that from any other cause. One death in seven is caused by tuberculosis. It is estimated that in the whole world "three millions of people die annually of consumption;" in New York City, 5,490; in our own State, 2,200, and in Indianapolis, 259—(94).

The proportion of deaths due to this disease as compared with those caused by the great epidemics is forcibly expressed by Dr. Law as follows: "If the 5,490 deaths from tuberculosis which occur every year in the City of New York could be brought together in an epidemic lasting but one week, no small-pox, cholera or yellow fever scare would approach the panic which would be created; for when did all three of these diseases together create such a mortality in this city? Nay, if we take the whole civilized world and compare with the tuberculosis mortality all the accumulated deaths from war, famine, plague, cholera, yellow fever and small-pox, the latter are comparatively insignificant."*

EXTENT TO WHICH THE DISEASE PREVAILS AMONG CATTLE.

The extent to which the disease occurs in cattle and other animals is not known, as mortuary records are not kept. The official reports of slaughter-house inspectors and of officials making tuberculin tests afford sufficient data to indicate that it is very common in certain places. In Denmark, the cattle that were tested in the province of Bornholm showed 21.5 per cent. to be affected, and in the province of Seeland, 50.9 per cent.; the average of six provinces being 35.4 per cent.†

In Massachusetts, 16 per cent. of the cattle tested with tuberculin reacted, and in Iowa, 14 per cent. As the cattle tested were suspected in most cases, the per cent. is higher than the average. In Vermont, 14,155 cattle have been tested by request of the owners, and 4.53 per cent. found diseased. In this State we have tested 312 cattle, and found 2.2 per cent. diseased.

The records of the slaughter houses in Berlin show 15.1 per cent. of the cattle offered for food to be affected; in Prussia, 6.3 per cent.; Dresden, 14.4 per cent.; Bromberg, 26.2 per cent.; Upper Silesia, 9.5 per cent.; Midlothiase, 20 per cent.; Yorkshire, England, 22.8 per cent.; Durham, England, 18.7 per cent.; London, 2.5 per cent.‡

"Tuberculous cattle are said to number in Bavaria 0.225 per cent. (Gonieg); in Augsburg, 0.26 per cent. (Adam); in Baden, 0.2 per cent. (Lydtin); in France, 0.5 per cent. (Arloing); in Belgium, 0.4 per cent. (Van Hersten); in Paris, 6 per cent. (Friedberger and Frohner); in Holland, 20 per cent. (Schmidt); in Pomerania and Bomberg, 50 per cent. (Schanz, Albrecht); at Hildesheim, Hanover, 60 to 70 per cent. (Haarstick); in Leipsic, 20 per cent. (Rieck); in Edinburg, 26 per

*Law, Jas. Bull. No. 65, Cornell University Agricultural Experiment Station.

†B. Bang. "The Struggle with Tuberculosis in Denmark." "The Veterinarian," Vol. LXVIII, pp. 688-710.

‡Report of the State Board of Cattle Commissioners, in Agriculture, in Massachusetts, 1894, pp. 384-385.

cent. (Cope, McFaydean). American figures given by the Bureau of Animal Industry are, for Baltimore (mostly cows), 2.5 to 3.5 per cent., and for the packing centers (among 2,273,547, mostly steers), 0.02 per cent."*

The extent to which the disease occurs in this State is difficult to determine. The first use which we made of the tuberculin was in December, 1893. Since that time we have tested herds occasionally until we have tested in all 312 head of cattle. Of this number, seven have been condemned. Our tests were made upon our own herd, five private herds, and the herd at the Northern Indiana Insane Asylum. Five of the animals condemned belonged to the Experiment Station. This herd was composed of several breeds, and was being continually augmented by purchases from several stock farms. The introduction of the disease seems to have been by one purchase. The herd of the Insane Asylum is composed, for the greater part, of grade animals, purchased from various farmers, but failed to show a single case of the disease.

The report of the State Board of Agriculture for 1895 states that the Live Stock Sanitary Commission killed 14 cattle and quarantined 551 during 1895 on account of tuberculosis, but does not give the location of these cases.

During the year I have had monthly reports from twenty veterinarians, and recently had a special report from eighty veterinarians, relative to the number of cases they have had in their practice since Jan. 1st, 1896. The exact number of cases was not given by all, but was small. It has been observed at Asherville, Brunswick, Dana, Evansville, Franklin, Fort Wayne, Greencastle, Kokomo, La-Fayette, Lebanon, Muncie, New Albany, Noblesville, Rensselaer, Richmond, Rushville, Terre Haute, Vincennes and Warsaw.

The cases observed were nearly all among dairy cattle, and more are reported as being suspicious. The tuberculin test was not used in making the diagnosis.

This would seem to indicate that we have but little of the disease in the State, but such a conclusion might be far from true, as people are not inclined to employ a veterinarian to treat such animals. During the three years I have been at this place, I have been called upon but once to treat a case. Frequent visits to the "knackers" have shown that nearly all the old cows that came there died of the affection. One dairyman furnished nine tuberculous cows. The public slaughter of the affected animals at the Purdue farm excited local interest in the disease, and the following week I found three affected cows at the "knackers." I have not had an opportunity to inspect meats except at the local abattoir, and although we have made frequent visits, I have not seen a diseased carcass. The meat inspectors at the abattoir at Indianapolis report very few cases.

The preceding figures show conclusively that the disease is common, and although we may not have as much in our herds as in those of older countries, the tendency is to increase, and therefore the means for recognizing and suppressing it should be known.

* Law Jas. Bull. No. 65, Cornell University Agricultural Experiment Station.

TUBERCULOSIS, A CONTAGIOUS DISEASE.

Tuberculosis is a contagious disease. Its contagious nature has been recognized for centuries, it was first demonstrated in 1865, but the specific cause was not discovered until 1882, when Dr. Robert Koch separated the *Bacillus tuberculosis* for the first time. The early conception was that the disease was caused principally by breeding (transmitted through heredity) and unwholesome sanitary conditions. The observation had frequently been made that the disease was found only in certain families or in certain stables. Recent research has demonstrated that heredity and improper sanitation are only accessory causes, and that the *Bacillus tuberculosis* alone is responsible for the affection. Between 1865 and 1884, 369 experiments were conducted, proving that the disease might be induced through the excretions, through the milk or through the meat of affected animals. Since 1884 a much larger number of experiments have been made, and are much more reliable, as it could be determined whether the material used contained the germs. The evidence from these sources demonstrates conclusively the identity of the disease in man and the lower animals, and the possibilities of infection. The reason for its not being generally regarded as being contagious is the fact that it is usually very slow in developing. Weeks, months, or even years may elapse before the symptoms are sufficiently marked to be recognized.

THE GERM OF THE DISEASE, OR TUBERCLE BACILLUS.

The germ or tubercle bacillus is a small rod-like plant about one ten-thousandth part of an inch long. It is about ten times as long as broad, is rounded at each end, occurs singly, in pairs, or three or four connected in a chain. The germ is very slow in growth, attaining its maximum rate at the body temperature. It is not possessed of movement. It is possessed of great vitality, resisting high temperature, freezing, moisture, drying, putrefaction, and even digestion. It is killed by a temperature of 158 degrees F. for ten minutes, but is not affected by freezing and thawing. It is killed by exposure to the direct sunlight for a few hours, but will withstand a strong diffused light for a week, and live in an ordinary room two and one-half to three months. If dried in the shade, it will retain vitality for a long time. In moisture it is not known how long it will survive. Owing to its remarkable power of resistance, it may be disseminated with dust in the atmosphere, be distributed with secretions on mangers and watering troughs, be carried in milk, withstand the souring process, remain hidden in a piece of meat and survive if the meat be not thoroughly cooked. It is possessed of a low power of absorption of liquids, and thus the difficulties of disinfection are increased.

PREDISPOSING CAUSES.

The predisposing causes of tuberculosis are those which will tend to make the body less resistive to the action of the germ. They may be grouped under two heads, due to breeding and to hygiene. Under breeding may be considered heredity, in-and-in-breeding, and breeding too young. It has been found that tuberculosis so often occurs in families (both in the human and in cattle), and

persists through successive generations, that the idea of its being hereditary is firmly fixed in the minds of most people. That the disease is rarely hereditary is proven by the facts that only a very small per cent. of calves are affected. In Berlin the slaughter-house records show 15.1 per cent. of all adult cattle to be affected, but only .11 per cent. of calves. Dr. Smith of the Bureau of Animal Industry estimates only .2 per cent. of calves of badly affected mothers to have congenital tuberculosis. It is only the predisposition the weakened constitution or organ that is transmitted by heredity. The germ gains entrance into the system through cohabitation with other animals, or the food, and finds the offspring of affected parents readily susceptible.

Slaughter-house reports further show that the lesions in young stock are nearly always confined to the intestines, indicating that the disease has entered the system through the food.

In-and-in-breeding tends to intensify paternal characters. If a weakness exist, the tendency is to become weaker. If disease exist, the offspring is made more susceptible. In-and-in-breeding has a legitimate place in the improvement of a herd, but can not be practiced with safety with diseased animals. Breeding too young has the effect of weakening the constitution and therefore decreasing the powers of resistance.

The sanitary surroundings unquestionably have an influence upon the health and vigor of animals. Dark, damp, dusty, illy-ventilated, and closely-crowded stables can have none other than a pernicious effect upon the body, whether disease be present or not. Such conditions are the most favorable that can be found for the dissemination of the germ and for retaining its vitality outside of the body. While it is under such conditions that the greatest number of cases are found, they are not of themselves the initial cause. The disease may occur in stables of modern construction, or among cattle never having been confined under cover for a single night. Drs. Stalker and Niles, in Iowa, record cases in which the cattle had always been on the range, and the writer saw several cases in Florida where the cattle had never had more protection than a roof. The exciting cause in all these cases has been the presence of a diseased animal, the sanitary environment merely determining the rate with which the disease would be communicated to other animals, on the assumed basis of equal resistance or susceptibility.

EFFECT OF THE DISEASE UPON THE BODY.

The lesions produced by the germ have been determined by post-mortem examination. Wherever the germ locates, it produces a local irritation and forms minute tubercles. These consist of diseased tissue enclosed in a capsule. They appear as pearly white nodules from the size of a pinhead to that of a pea. These tubercles may occur in large numbers on the surface of the lung, in the lung tissue, on the pleura, and on the serous membranes in the abdominal cavity. As these nodules increase in size, the tissues within are broken down and have the appearance of pus, or have a cheesy consistence. It is not infrequent that mineral matters are deposited within them, producing a gritty feeling. As these develop, especially within the lung tissue, the irritation produces a greater secretion of mucus within

the air tubes, or ulcerations may occur, permitting a discharge of matter into the air passages. Both conditions will produce coughing. Later these tubercles unite, causing tubercles as large as grapes on the surface of the lung, or membranes of the abdomen. Inside of the tissue they combine, forming abscesses from the size of a pea to that of the fist. The contents are pus-like, or cheesy. The surface of the lung and the wall of the chest may become united by diseased adhesions. The glands along the trachea and between the lobes of the lungs are nearly always affected. In the abdominal cavity the tubercles are essentially the same as those in the lungs. The liver is often the seat of immense tubercles, some being four inches in diameter. The reader is referred to the plates to get their general appearance.

The location of the tubercles in the body is found to be about as follows:• Generalized, 6.26 per cent.; lungs, 75.37 per cent.; pleura pulmonalis, 55.49 per cent.; peritoneum and mesentery, 48.27 per cent.; pleura of chest wall, 46.71 per cent.; bronchial glands and mediastinal glands, 29.43 per cent.; liver, 28.24 per cent.; spleen, 18.53 per cent.; uterus, 10.17 per cent.; inguinal glands, 5.30 per cent.; pharyngeal glands, 4.85 per cent.; trachea, 3.39 per cent.; udder, 1.62 per cent.; intestinal, 1.30 per cent.; ovary, 1.25 per cent., and lymph glands of the liver, 1.16 per cent.

SYMPTOMS OF THE DISEASE.

Tuberculosis is characterized by the variety of forms it may assume; as, invading the lungs, attacking the bowels, locating in the bones or joints, destroying glands, or affecting the skin or special organs. It follows, then, that the symptoms will vary greatly in different individuals, according to the organ or part affected. Special symptoms accompany the lesions of any part, but to describe all would produce confusion. In general, the symptoms may be divided into two classes, those present when the lungs and thorax are the seat of the affection, and those present when the bowels and abdominal viscera are diseased. In advanced cases the disease is usually found in both the lungs and bowels.

Two types of the disease are recognized, an acute and a chronic form, the former requiring but a few weeks, and the latter months or years to run its course. The symptoms will be described for chronic cases, but are equally applicable to those of the acute type, in which they are much more aggravated.

The early symptoms in pulmonary consumption begin by a slight, short, rather deep cough, which gradually becomes harsher and more painful. At first they are infrequent, but become paroxysmal (half a dozen to a dozen in succession), especially in the morning, upon sudden change in temperature, or upon taking a little exercise. These symptoms are likely to escape attention, as in general appearance the animal is all right, eats heartily, lays on flesh, and gives milk as usual. As the disease advances these symptoms become more marked, the animal chills easily when turned out from shelter, the coat becomes rough and tight, breathing is harder, exhaustion follows slight exertion, the neck becomes clean and thin, there is a wasting of the body, especially behind the shoulder blades, and pressure along the edges of the ribs provokes pain.

* Hills, J. L., and Rich, F. A., Bull. No. 42, Vt. Agl. Expt. Sta.

If the ear be placed over the walls of the chest, areas may be discovered which do not give a respiratory murmur, indicating solidification. During this time there is likely to be a discharge of a white mucus from the nostril. As a rule, the animal eats fairly well, but can not be kept in condition. If the animal be receiving an abundance of nutritious food, care and shelter, it is remarkable how far the disease may progress before the symptoms will indicate how grave is the affection. *In the last stage* these symptoms become still more marked, and by that time the disease has invaded other organs, so that the symptoms are complicated with digestive troubles, suspension of milk production, or lameness.

When the digestive organs, as the stomach, intestines, liver, mesenteries, etc., are affected, the symptoms are characterized by troubles of such a nature as to be diagnosed with difficulty. Attacks of constipation, bloating, colic, suspended rumination, and diarrhea come on without apparent cause; the appetite may be voracious at times, and at other times very mincing. In the early stage the animal is said to be a "hard feeder," as it will gain for a time and suddenly lose what has been made. The condition of the coat betrays something wrong, and it is usually described as being "out of condition." As the disease advances, these periodical attacks become shorter and more severe, the skin is hard, dry and scurfy, there is a marked tucked-up appearance in the flank and a general emaciation. If the subject is a milch cow, the flow becomes reduced, or ceases altogether. If the lymphatic or other glands near the surface are affected, they will feel hardened and enlarged.

When the bones and joints are affected, there is a lameness of a rheumatic type at first, but which later becomes persistent and is characterized by an absence of local pain on manipulation. There is no distinctive symptom of the disease in the udder, as it may affect one-quarter, a half, or the whole; it may be localized as a single module or be diffused; it may form a single suppurating abscess or produce a condition similar to chronic garget.

The temperature during the advanced stages runs from 99 degrees F. to 104.5 degrees F., the normal being about 101.5 degrees F. The pulse and respirations also vary.

The disease, as a rule, does not occur as isolated cases, but several occur together, or near together. It is persistent and remains on the same premises year after year.

It must be apparent, then, that diagnosis from the symptoms or by physical methods is attended with difficulties, especially during the earlier stages, and gives opportunity for error during the latter. It is possible for the expert to make a diagnosis from microscopic examination of the mucus secretions of the nostrils and of the milk in some cases, but not until the disease has so far advanced that tissues have broken down and are discharging the bacilli. Another method is to inoculate small animals, such as guinea-pigs and rabbits with secretions or milk, and after a few weeks make an autopsy. This is not an infallible test, but is more reliable than microscopic examination. Lastly we have the tuberculin test, a test which can be used at any stage of the disease, and which, for accuracy or ease of application, has not been surpassed. It is not infallible, but in careful hands the percentage of error has been very small, "one-quarter of one per cent. (Osgood.)

TUBERCULIN.

Tuberculin is the product formed by the growing tubercle bacilli. A pure culture of tubercle bacilli is placed in a proper culture medium and allowed to grow for some weeks. At the end of this time the whole is boiled for sufficient time to insure the death of all germs. The material is then filtered to remove the germs from the solution. It is again boiled to reduce the mass to a proper degree of concentration and bottled ready for use, care being taken to keep the material sterile. As a rule the material is diluted with a two per cent. solution of carbolic acid before using. The complete product, ready for use, *contains no living germs.*

A tuberculin test is conducted as follows: The temperature of the animal to be tested is taken every two hours, beginning at six or eight o'clock in the morning and continued until ten o'clock at night. Thirty drops of a ten per cent. solution of tuberculin are injected under the skin, at that hour, and temperature again taken the succeeding day on the corresponding hours. The hours suggested for making the test are merely for convenience, as it requires the minimum amount of night work. The place selected for making the injection is usually over the shoulder blade, as the region is one easily penetrated by the hyperdermic needle and the movements of the animal offer least interference to the operator. Immediately before making the injection, the spot is carefully washed out by an anti-septic solution to prevent infection by outside organisms. The object in taking the temperatures on the day before the injection is to determine the normal temperature of the animal, and if it run above 102 degrees F., a test should not be made, as this indicates fever. The tuberculin does not produce a reaction under six or eight hours, so that it is not necessary to begin taking the temperatures for six hours succeeding the inoculation, and in practice it is usually made eight. A careful comparison is made of the temperatures for the corresponding hours of the two days, and if disease be present, there will be a rise of temperature, beginning about eight or ten hours after the injection. The temperature should gradually increase until about the fourteenth or sixteenth hour, and then decrease, returning to normal at about the twentieth to the twenty-fourth. The rise may start a little earlier or later, but should gradually increase and decrease. A very sudden rise and fall is not indicative of this disease. If tuberculosis be not present, there will not be a characteristic rise and fall of temperature. The following temperature readings from our test will illustrate the reaction which occurs:

		A. M.			M.	P. M.				
		6	8	10	12	2	4	6	8	10
Manada	22	102.6	102	100.8	101	101.4	101	101.2	101	101.4
	23	102	103.6	104.8	106.8	106.2	105.4	104	104	102
Commodore	22	100	108.8	101	100.4	101	101	101	101	101
	23	100	100	101	100.8	100	100.6	100	100	100
Jennie	22	100.2	102	101	101.2	101	101	101.4	100.6	100.8
	23	102.2	103	103.6	104	105.6	105.6	103.8	102.8	102
Roxana	22	101.8	102.2	101.6	101.4	101	101.4	101.2	100.6	100.6
	23	102	101.4	102	101.6	101	101	101	100.6	99.6
Caspian	22	100.2	101	100	101.2	101	100.8	100.4	100.2	100.4
	23	100	102	103.4	105	105	104	103.4	102.6	101.8
Blossom	22	101.6	101.6	100.8	101.2	101.4	101.2	101.2	100	100
	23	101.8	101.8	102	101.8	101.8	101.8	101.8	100.2	100.6

The degree of elevation in temperature has no relation to the extent of the lesions, a very mild form of the disease producing a very high temperature, while animals in the advanced stages fail to react at all—the latter is exceptional however. If a doubt exists as to the reaction, a second test may be made in about four months, using about one and one-half times the usual amount of tuberculin.

Objections have been made to the tuberculin test because it is not infallible in the temperature reaction, failing to react in some cases, and indicating disease in others when not diseased at all, and indicating disease when the lesions are so small that they appear harmless. It should be remembered, however, that no remedy is infallible. In 924 animals slaughtered by the Vermont State Board of Agriculture only four failed to show the presence of the disease, and these were not subjected to a microscopic examination.* The errors made by the use of tuberculin in careful hands are too small to stand as a valid objection. That it does indicate disease when the lesions are very small only argues the delicacy of the test. The argument sometimes advanced that it produces the disease is untenable, as no living germs are introduced.

THE EFFECT OF TUBERCULIN UPON HEALTHY STOCK was studied by Dr. Law. Seven full injections were made upon healthy cows, at intervals of one week, without any appreciable effect upon the health, milk production, quantity of butter-fat, body weight, temperature, pulse or respirations. The same result was obtained by the Bureau of Animal Industry. All the animals in our herd have been tested once, a part twice, and a part three times, at intervals of one year, and no ill effects noted. The observations of many veterinarians accord with our own. If ill results follow, they must be due to impure material or faulty operation. The specific effect is to temporarily aggravate existing tuberculosis.

The expression of the highest opinion upon the value of tuberculin as a diagnostic agent is found incorporated in the resolutions of the United States Veterinary Medical Association for September 12, 1895, the European Veterinary Congress held at Berne, Switzerland, during the same month, and the United States Veterinary Medical Association of September 3, 1896.

The resolutions of the meeting at Berne are as follows:

"Tuberculin is a reliable diagnostic agent.

"There need be no fear that tuberculin, properly used, will cause generalization of pre-existing disease."

The resolutions of the U. S. V. M. A., September 3, 1896, are as follows:

"Tuberculin furnishes incomparably the best means of recognizing tuberculosis in living animals.

"Tuberculin, properly used, for diagnostic purposes is entirely harmless to healthy cattle, and is so exceedingly accurate in its effects that the few errors resulting from its use can not affect the general results, and are of less frequent occurrence than following the use of any other method of diagnosing internal diseases."

While the testing seems to be a simple matter, we can not recommend the owners to do the work. It would be best to employ a competent veterinarian.†

*Report of the Vermont State Board of Agriculture for 1896, acting as Cattle Commissioners.

†Tuberculin may be obtained from the Pasteur Vaccine Company, Chicago, Ill.

TREATMENT.

The treatment of the disease must be wholly along the lines of prevention, as curative means are unknown. The effort must be broad-gauge, taking into consideration both the means to prevent the dissemination of the germs and to increase the resisting powers of the animal. The first contemplates the separation of the diseased from the healthy animals, and the rearing of the young dropped from tuberculous mothers on the milk from healthy cows. The separation can only be made by the tuberculin test. New animals should not be introduced into a herd of healthy cattle without being tested.

We can only cite our readers to one large experiment to show the development of a healthy herd from an infected herd.* This was conducted by Professor Bang, and consisted in testing a herd of 208 cattle with tuberculin, separating the reacting from those not reacting, disinfecting, and rearing the offspring on milk from healthy animals. The herd was decreased by sale and slaughter of animals which had lost their usefulness, and increased by their own get. At the beginning there were from 130 to 135 cows and bulls, of which 80 per cent. were affected, the remainder—heifers or young stock—40 per cent. of which were affected.

The result of the experiment appears in the following figures:

	Reacting Division.	Healthy Division.	Reacting Animals in the Healthy Division.
1892—April	131	77	. . . . .
October		77	—7
1893—May	90	103	—10
October		107	—1
1894—May	81	122	+2
October		119	—1 (?)
1895—May	69	136	—2 (1) +1 (?)
October		132	—2 (2)

By careful separation, and without reducing the herd, the number of healthy animals has been increased from 77 to 132 in three years. The number of cases occurring in the healthy division has been very small since the first year, and the result must be considered as highly successful, and indicative of the line that may be pursued to stamp it out. Several other experiments along the same line are in progress.

It would therefore appear that condemnation of very valuable breeding stock is not justifiable in every case, as their offspring may be used with safety. In the case of ordinary stock the increased expense of separation, handling, etc., may not warrant keeping them for their offspring.

The question also arises, how often is it necessary to test the herd? If a herd be tested and found to be healthy, and be kept up only by natural increase, no

*Hatch Experimental Station Bulletin, No. 41.

further testing is necessary. If disease be found and all the affected animals removed, a second test should be made a year later.

PRECAUTIONARY MEASURES.

From what has been said already upon breeding and stable hygiene there is little need of reiteration.

Briefly, those stable conditions which will secure the most nearly perfect separation of animals in stalls, individual feed boxes, mangers and watering apparatus, etc., are the best. Along with these should go plenty of light and air, no overcrowding and not too much warmth. The stall arrangement may depend somewhat upon the character of the business. If the animals are all free from disease, and additions are not made except from the natural increase, there is not the same necessity for such exclusive arrangements as in herds where outside stock is purchased at short intervals. The writer tested one herd founded about sixteen years ago, the animals in the present herd being nearly all offspring of early purchases. A part of this herd is stalled by the ordinary arrangement (two rows of cows facing, the heads being only a few feet apart, using a common feeding floor and separated from each other only by stanchions, so that one animal inhales the breath of another, and the food becomes more or less mixed) which from a sanitary standpoint has nothing to commend it. Of the twenty-eight animals tested, one reacted, and that one was a bull of rather recent purchase, and fortunately was not kept in the same stable or permitted to run with the cattle. To introduce a tuberculous animal into a herd with such a stable arrangement would be to spread the disease at the maximum rapidity. In the college herd the cattle have individual stalls, mangers, feed racks, etc., but low partitions. Frequent changes have been made, and out of twenty-eight animals, six were tuberculous when tested in 1895. No additions have been made since, and no further disease located. If frequent change be made it has been found that an individual stall, with solid high partition, standing in front of the feed manger and on each side, affords the greatest protection.

If tuberculosis be discovered in a stable, it is not sufficient to remove the animal from the stall, but a thorough disinfection should follow. There are numerous disinfecting solutions that may be employed, but I would recommend formaline as a wash for everything. It can be used at the rate of one part to four or five hundred parts of water (one quart of 40 % to 50 gallons), and be effective. Scrub the mangers, partitions, stanchions, ceiling and walls. This disinfectant is not expensive, and has the decided advantage over corrosive sublimate of not being poisonous to stock, should they lick the woodwork. A second part of the disinfecting system is to paint the walls, ceilings and other woodwork with a paint mixed with turpentine instead of oil. This is much more effectual than whitewash and is recommended for such stables as would be whitewashed.

The testing of the animals with tuberculin, and removal of the diseased, is more than half the battle, but disinfection is necessary to make the work thorough.

RELATIONSHIP TO PUBLIC HEALTH.

The relationship of tuberculosis in animals to the same disease in man is the one of primary importance. It is to the financial interest of the owner to exterminate the disease from his herd, but it is to the interest of the public that the disease be stamped out of herds if through the milk and flesh human life is endangered. Whenever scarlet fever, diphtheria, small pox, cholera, etc., break out in a community, no time is spared in sending for the local health officer, or even applying to the State Board of Health for a quarantine. No one doubts the contagiousness of these diseases, the danger of carrying them around, nor the ability to suppress them if proper measures be employed. The essential difference between the diseases just mentioned and tuberculosis is the fact that the germs of the latter are not so active in securing a foothold in the system, nor so rapid in developing the disease, as it may be weeks, months or even years from the time they entered the system until the symptoms are manifested. The same principle is involved in all these diseases—the presence of the germ is necessary to start the affection, no matter whether it enters the system through the air we breathe or the food we eat.

The question is often asked, "Why do not more people die if milk and meat are sources of infection, as their use is universal?" The question might as well be, "Why do not all people catch diphtheria?" The answer in either case is the same. Every person possesses a certain resistance to disease; only those that are susceptible take the disease. As a matter of fact, in this State, six times as many people die of tuberculosis as from diphtheria. With the same exposure, tuberculosis is less contagious than diphtheria, so that the greater mortality must be due to less preventive precautions.

Experiments to determine the infectiousness of milk and meat have been carried on by using small animals, as rabbits, guinea pigs, dogs, pigs and calves. The results have always been that some would become affected; the per cent. in some cases being rather small and in others very large. The variation could be accounted for in some cases by the length of time the experiment was conducted and the character of the material used. Physicians have recorded numerous instances of tuberculosis on people where neither parent had tuberculosis nor traces of the disease through heredity. The evidence in some of these cases has been almost conclusive that it was obtained through the use of cow's milk. Dr. Harold C. Ernet, in collecting data upon cases in human practice due to infection, says: "Here are something like two thousand references to articles written in all languages and in different parts of the world, bearing upon and proving the infectious nature of tuberculosis, including only the literature extending over about the past seven years."

In May of the present year the writer addressed letters to eighty prominent physicians in this State, asking whether they had ever had tuberculous patients, whom they believed to have contracted the disease through the use of milk from cows. Fifty-five of these gentlemen made reply. None said positively that they had ever had such cases. Nearly all stated that they did not attempt to learn the wholesomeness of the milk supply, especially in cities, and, further, had no means

of recognizing the disease in the cows. The general opinion of all as to the advisability of using infected milk is well expressed in the letter from Dr. Theodore Potter, Professor of Bacteriology in the Indiana Medical College, Indianapolis:

DEAR DR. BITTING—You ask whether I have met with cases of tuberculosis in children, traceable to their use of milk from tuberculous cows.

I can not say that I have ever been able to prove such a connection. Tuberculosis is so insidious in its development and the physician's opportunity for exact knowledge of the milk so slight, that the origin of a given case of the disease in impure milk can seldom be demonstrated. We must, therefore, rest for our own opinions largely upon indirect evidence.

We know that tuberculosis is due to a recognizable germ. We know also that this germ may be present in the milk of tuberculous cows, and being obtained from such milk, may, by inoculation tests, be shown capable of producing tuberculosis.

While, therefore, we may not know that a particular case of human tuberculosis was due to infection from a particular milk supply, yet we do not know that such milk, if from a tubercular cow, may have produced the disease in the child, and we are sometimes able to demonstrate that it will do so if introduced into healthy animals.

These facts, therefore, furnish ample ground for the greatest care in ruling out one of the demonstrable sources of danger. Yours very truly,

THEODORE POTTER.

With such proofs of the infectious properties of milk and flesh and such general opinion among physicians that such food should not be used, the question arises, what disposition can be made of the tuberculous animal? Opposition to the logical answer arises largely because of the value of the property which would be destroyed.

In order to determine if a carcass or any part of it could be used for food, a royal commission was appointed in Great Britain to make an exhaustive study of the subject. The commission worked for five years and expended \$90,000 in prosecuting their work. They studied every butcher's cut, the contamination of meat already free from infection by the ordinary operations in butchering and the effect of cooking. They found 36 per cent. of their pigs, 16 per cent. of the guinea-pigs and 15 per cent. of the rabbits became affected when fed on the diseased carcass. The experiments were carried on with such care that no question could be raised as to the accuracy of the results.

The following is a *résumé* of their report:

We have obtained ample evidence that food derived from tuberculous animals can produce the tuberculosis in healthy animals. The proportion of animals contracting tuberculosis after experimental use of such food is different in one and another class of animals; both carnivora and herbivora are susceptible, and the proportion is high in pigs. In the absence of direct experiments on human subjects we infer that man can also acquire tuberculosis by feeding upon materials derived from tuberculous food animals.

The actual amount of tuberculous disease among certain classes of food animals is so large as to afford to man frequent occasions for contracting tuberculosis through his food. As to the proportion of tuberculosis acquired by man through

his food or through other means, we can form no definite opinion, but we think it probable that an appreciable part of the tuberculosis that affects man is obtained through his food.

The circumstances and conditions with regard to the tuberculosis in the food animals which lead to the tuberculosis in man are, ultimately, the presence of active tuberculous matter in the food taken from the animal and consumed by the man in a raw or insufficiently cooked state.

Tuberculous disease is observed most frequently in cattle and swine. It is found far more frequently in cattle (full grown) than in calves, and with much greater frequency in cows kept in town cow-houses than in cattle for the express purpose of slaughter. Tuberculous matter is but seldom found in the meat substance of the carcass; it is principally found in the organs, membranes and glands. There is reason to believe that tuberculous matter, when present in meat sold to the public, is more commonly due to the contamination of the surface of the meat with material derived from other diseased parts than to disease of the meat itself. The same matter is found in the milk of cows when the udder has become invaded by tuberculous disease, and seldom or never when the udder is not diseased. Tuberculous matter in milk is exceptionally active in its operations upon animals fed either with the milk or with dairy produce derived from it. No doubt the largest part of the tuberculosis which man obtains through his food is by means of milk containing tuberculous matter.

The recognition of tuberculous disease during the life of an animal is not wholly unattended with difficulty. Happily, however, it can in most cases be detected with certainty in the udders of milk cows.

Provided every part that is the seat of tuberculosis matter be avoided and destroyed, and provided care can be taken to save from contamination by such matter the actual meat substance of a tuberculous animal, a great deal of meat from animals affected by tuberculosis may be eaten without risk to the consumer.

Ordinary processes of cooking applied to meat which has been contaminated on its surface are probably sufficient to destroy the harmful quality. They would not avail wholesome any piece of meat that contained tuberculous matter in its deeper parts. In regard to milk, we are aware of the preference of English people for drinking cow's milk raw—a practice attended by danger on account of possible contamination by pathogenic organisms. The boiling of milk, even for a moment, would probably be sufficient to remove the very dangerous quality of tuberculous milk.”*

American investigators do not agree with the English upon the ease of diagnosing an affected udder. In our own post-mortems we found tuberculosis of the udder that could not be detected by physical examination. Furthermore, it can never be told when the disease in an affected animal will attack this gland.

It is seen that it requires great care in the handling of infected or contaminated meat, to cook it sufficiently to render it harmless, and that the milk must be Pasteurized at 155–160 degrees for ten minutes, or boiled. The cooking of the milk gives it an unpleasant flavor.

*“The Veterinary Journal,” Vol. XL, pp. 411-427.

INSPECTION.

All cattle slaughtered for inter-state or export trade are inspected by an official appointed by the government. Tuberculosis is one of the diseases of which he takes cognizance. All animals having generalized tuberculosis are condemned; those having local lesions that are small, not discharging, no indications of fever or unthriftiness, are passed as being fit for food. The extent to which an animal may be diseased and be passed will depend largely upon the judgment of the inspector.

The inspection in foreign countries is much the same as in our own.

The poorer grade of cattle, old cows, etc., are slaughtered in local markets, where no inspector is present.

Milk is not easily examined for tubercle bacilli, and as far as we have been able to learn, very little work has been done along that line in this State. A few of the larger cities have a dairy inspector.

The question arises, what can stock owners do toward freeing their herds, and what assistance should the State give in the matter? We believe more can be accomplished by intelligent work on the part of the breeders toward eradicating the disease than can be accomplished in any other manner. When once instructed as to the character of the disease, how it may be diagnosed, its contagious nature and danger to public health, as well as to other stock, they have it in their power to select their breeding stock and purchase only those that are tested and found free from disease.

Opposition to any measure, no matter how radical, would soon cease if owners could feel that the result accomplished would not be of a temporary but a permanent character. The argument is brought forward that consumptive people handle cattle, and that the same influences which now are active in producing the disease would continue, and in a few years just as many animals would again be affected. We have no experiments showing infection of cattle from people. The possibility of such infection is admitted, but the probability of extensive infection is doubted by many. We are now in possession of numerous records of herds that were freed from the disease two or three years ago and have remained so.

The part which the State should take in controlling the disease is one not easily settled. In some places the government requires cattle to be tested and pays an indemnity for all animals destroyed. In other places only such cattle are tested as the owner requests, and full or part indemnity is paid for all animals that are destroyed, and in other places the test is made but no indemnity is paid. Each class has its advocates. From the reports of the work in different places, it seems that Vermont has a fairly satisfactory plan. The State furnishes the tuberculin and veterinary service free for making the test. The test is made upon request of the owner, and for all animals condemned one-half their value is paid.

The success or failure of State attempts to cope with the disease will soon be demonstrated, and we should profit by their experience. In the meantime our State should be a partner in assisting stock owners in eradicating the disease from their herds to the extent of furnishing the tuberculin and veterinary service free to

those who may request it. Every city should have the power to require all dairy-men that sell milk within the corporation to have their herds tested so as to insure a wholesome quality of milk.

SUMMARY.

Tuberculosis or consumption causes the death of nearly 14 per cent. of all people that die in Indiana; two and one-half times as many as caused by typhoid fever, four times as many as caused by diphtheria, twenty times as many as caused by scarlet fever, and nearly ninety times as many as caused by small pox.

It is estimated that one death in seven among all people is caused by this disease.

Tuberculosis affects domestic animals, especially cattle. The per cent. of cattle found to be affected is very high in some places and low in others. The disease exists in herds in this State, but to what extent is not known.

Tuberculosis is a contagious disease and caused by the *bacillus tuberculosis*. It may be transmitted from one animal to another by living close together or by drinking the milk or eating the flesh of an affected animal.

The disease is identical in man and animals, and people may contract the disease from animals by the use of affected milk or meat.

It is very difficult and oftentimes impossible to diagnose the disease in cattle by physical means.

The disease may be diagnosed with accuracy by means of tuberculin.

Healthy cows are not affected in any injurious manner by injections of tuberculin.

Physicians agree that the milk and meat of affected animals should not be used for food.

Stockmen should use all the means within their power to prevent the spread of the disease in their herds. All affected animals should be separated from the herd—using the tuberculin test. Only healthy, vigorous animals should be used for breeding purposes, and the sanitary condition of the stables, as regards ventilation, light, etc., should be of the best.

The State should assist in stamping out the disease as a safeguard to public health.

COMMERCIAL FERTILIZERS.

Purdue University,H. A. HUSTON, STATE CHEMIST, AND W. J. JONES, JR., ASST. CHEMIST.

The estimated sales of commercial fertilizers in Indiana during 1896 amounted to 42,000 tons. This is an apparent decrease of 3,000 tons from the estimated sales in 1895. The decrease is, I believe, only apparent, for it now seems probable that the estimate for 1895 was too high, owing to a considerable number of tags being carried over which were really used in 1896, although they appear in the 1895 sales. It is probable that an estimate of 42,000 tons in 1895 and 45,000 tons in 1896 would more nearly express the real facts.

In the 42,000 tons for which tags were issued were 10,700 tons of bone and non-acidulated packing house products; 21,800 tons of "complete" fertilizer, that is, acidulated goods containing phosphoric acid, nitrogen and potash; 3,300 tons of ammoniated phosphates; 1,700 tons of acid phosphate and potash, and 4,400 tons of plain acid phosphate. Of the bone and non-acidulated packing house products 400 tons had received an addition of potash.

Comparing the sales in each group with the sales of the previous year, we find that there has been an increase of 1,500 tons in sales of "complete" fertilizers, an increase of 1,000 tons in the sales of plain acid phosphate, a decrease of 500 tons in the sales of ammoniated phosphate, a decrease of 1,100 tons of acid phosphate and potash, and a decrease of 4,300 tons in the sales of bone and acidulated packing house products.

The amount of plant food in the fertilizer sold in 1896 includes 5,643 tons of actual phosphoric acid, of which 3,171 tons were in the form of "available" in acidulated goods, 1,143 in the form of "insoluble" in acidulated goods, and 2,320 tons were in bone and non-acidulated packing house products.

In the plain acid phosphates the average per cent. of available phosphoric acid was 13.85. Only one sample contained less than ten per cent. available, and only three samples less than 12 per cent. One-third of the samples contained 16 per cent. or more of available. The single sample containing less than 10 per cent. available, was made by mixing a sample of high grade superphosphate containing at least 16 per cent. available with a "dryer" or "filler" made of ground shells. The purpose seems to have been to produce a goods that could be sold at a low price per ton. While the price per ton is low, the price per pound of available phosphoric acid in such goods is higher than the price per pound in high grade superphosphates. In this sample the mixture seems to have consisted of about equal parts of superphosphate and "filler". The amount of available phosphoric acid in a ton of this goods ought to be purchased for nine dollars, in the shape of one-half ton of acid phosphate containing 15 per cent. available. But if the ton of the mixture containing the same amount of available be used, there must be the

extra charge for the cost of the filler, the cost of mixing, a double amount of bags, handling, freight and retailers' profits. Nor is this the only disadvantage, for the "filler", consisting largely of carbonate of lime, causes the water soluble phosphoric acid to "revert" and become insoluble in water; and although it will still be reckoned as "available" it will be less readily distributed by the soil waters.

While the composition of some of the materials used in compounding "complete" fertilizers makes it necessary to sometimes bring the available phosphoric acid to about 10 per cent. in the finished product, in order to obtain the desired ratio between the phosphoric acid potash and nitrogen, in the case of simple substances like acid phosphate no such necessity exists, and buyers will generally get the most plant food for a given sum by buying a superphosphate of high grade containing 15 to 18 per cent. available phosphoric acid.

The amount of *nitrogen* contained in the fertilizers sold in 1896 was 884 tons, equivalent to 1,073 tons of ammonia. Nearly all of this was derived from packing house products, although a few of the samples contained nitrate of soda and tobacco stems and garbage products.

The amount of *actual potash* contained in the fertilizers sold was 562 tons.

The actual amounts of phosphoric acid and nitrogen were 15 per cent. below the amount sold in 1895, while the reduction in the tonnage of fertilizers was 6.6 per cent. These losses are due directly to the reduced amounts of packing house products sold. The actual amount of potash sold in 1896 was 1.6 per cent. greater than in 1895.

The ratio between the total amounts of phosphoric acid and nitrogen sold remains quite constant. In 1894 there were sold 7.3 pounds of phosphoric acid to every pound of nitrogen; in 1895 and 1896, 7.5 pounds of phosphoric acid to every pound of nitrogen. But the ratio between the amounts of phosphoric acid and potash varies considerably.

In 1894 there were sold 12.8 pounds of phosphoric acid to every pound of potash, in 1895, 14.2, and in 1896, 11.8 pounds of phosphoric acid to every pound of potash. While the actual amount of potash sold shows a slight increase it is still true that the total amount of both nitrogen and potash sold in fertilizers in the State are insignificant when compared with the amounts of these substances removed by crops. The total amount of phosphoric acid applied in commercial fertilizers is also far below the crop requirements.

In view of these facts, I must again urge the importance of converting straw, stalks and other roughage of the farm into manure, and of utilizing leguminous crops for increasing the nitrogen supply. A number of progressive farmers in the southern part of the State report successful results from trials of the cow pea both as a manurial crop and a source of valuable feed. The plant seems to have done well on some farms where a difficulty was found in securing a good catch of clover.

There are doubtless special localities where commercial fertilizers may be substituted for manure on certain crops, but in view of the agricultural practice in this State they must be considered valuable supplements to barnyard and green manures, and not substitutes for them.

The use of fertilizers is gradually extending to the northern part of the State. Here both the character of the soil, and amount of rainfall differ so much from

what is found in the southern counties of the State, where the use of fertilizers is well established, that it seems that goods of different composition will be required for most profitable results. On the light sandy soil lands it is probable that goods with readily available phosphoric acid and more than the usual amounts of potash will be most satisfactory.

The considerable decrease in the amount of bone used in the State calls attention to a bulletin of one of the New England stations, in which is compiled the results of a number of pot experiments by several European investigators. The pith of the matter is that the phosphoric acid in bone is of no more value to the crop than the phosphoric acid in raw mineral phosphates, and that any increase in crop where bone is used over the crop where raw mineral phosphates are used is due to the nitrogen in the bone. The price of raw mineral phosphates is so low that the farmers would save a considerable sum if these results were obtained in field practice. These raw mineral phosphates have, from time to time, come on our market, but their use has not been continued, presumably because farmers have not found them profitable even at a low price. It is to be noticed that the European results were all obtained on soils totally different from those to which fertilizers are applied in this section, and under different climatic conditions. While we can not question the ability or disinterestedness of the men who have conducted these investigations, I believe that their results are not applicable under the conditions that exist in those parts of this State where fertilizers are most extensively used. There is a pretty general agreement among farmers that bone has a very high value as a wheat fertilizer, and the actual crop increases due to its use can not be wholly attributed to the small amount of nitrogen, seldom exceeding five pounds per acre, which is applied when bone is used. The use of bone in this State is based on many years of experience, and farmers are seldom disposed to question its value. Its comparatively high cost per ton leads them to ask if some form of fertilizer of equal crop-producing power can not be obtained for less money. But even here the question most frequently asked is not in regard to non-acidulated bone, but whether the available phosphoric acid of superphosphates made from mineral phosphates is of as high value as the available phosphoric acid in a superphosphate made from bone. It is probable that so far as this relates to the available phosphoric acid alone there is but little difference; but it must be borne in mind that the acidulated bone contains also a considerable amount of nitrogen, and that the insoluble phosphoric acid in the bone product is much more easily decomposed in the soil than that from the mineral phosphate. Superphosphates from mineral phosphates are now available, at a reasonable price, that contain high amounts of available phosphoric acid. But the farmer should not be governed by price alone, for cheaper phosphoric acid can not be a substitute for potash and nitrogen where these are deficient in the soil.

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TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Estimated Value per Ton.	Number.
1018	Bowker's Superphosphate.....	Bowker Fertilizer Co., Boston, Mass..	9.24	2.35	2.35	15.04	0.00	0.00	14.63	1018
1019	Bowker's Sure Crop Bone Phosphate.....	"	5.43	2.22	5.40	13.10	1.28	1.33	19.46	1019
1030	Urbana Superphosphate and Potash.....	The Loudenback Fertilizer Co., Urbana, O.	0.84	8.80	1.23	10.87	2.95	3.39	27.15	1030
1031	Urbana Bone Meal.....	"	4.11	5.96	2.93	13.00	3.35	3.72	30.37	1031
1040	Bone Black Fertilizer.....	Nolte & Dolch Fertilizer Co., St. Louis, Mo.	3.02	5.57	3.49	12.06	2.83	0.00	22.61	1040
1059	Pure Bone Meal.....	Haxton & Haxton, Worthington, Ind.....	0.00	6.88	15.43	22.31	4.96	0.00	30.56	1059
1073	Champion Bone Meal.....	S. W. Evans, Otisco, Ind.....	0.00	7.19	16.45	23.64	4.77	0.00	30.86	1073
1078	Zell's Dissolved South Carolina Phos.....	The Zell Guano Co., Baltimore, Md.....	12.50	1.89	1.24	15.63	0.35	0.00	21.94	1078
1083	Southern Indiana Fertilizer Co.'s Guano.....	Southern Indiana Fer. Co., Boonville, Ind..	4.30	3.34	4.73	12.37	3.72	1.01	26.61	1083
1103	Urbana Sweetstakes Bone Phosphate.....	The Loudenback Fertilizer Co., Urbana, O..	2.17	6.39	1.34	11.90	3.03	4.96	30.63	1103
1105	Bowker's Bone and Potash Square Brand.....	Bowker Fertilizer Co., Boston, Mass.....	2.52	5.71	3.08	16.29	2.53	2.51	26.96	1105
1107	Packaging House Bone.....	Alex. Miller & Co., Corydon, Ind.....	4.25	4.10	3.93	14.30	4.18	0.00	27.80	1107
1114	Bowker's Acid Phosphate.....	Bowker Fertilizer Co., Boston, Mass.....	6.38	6.01	3.43	15.82	0.46	0.00	20.85	1114
1118	Superphosphate with Potash.....	"	6.03	5.21	2.78	14.02	0.55	2.13	21.61	1118
1120	Lister's Special Potato Fertilizer.....	Lister's Agr. Chem. Works, Newark, N. J....	10.50	0.05	2.99	13.54	2.62	3.09	28.13	1120
1124	Dissolved Bone and Potash.....	Southern Ind. Fert. Co., Boonville, Ind.....	7.66	3.04	1.62	12.32	2.15	1.97	24.77	1124
1161	Lister's Auwa, Bone and Potash No. 2.....	Lister's Agric'l Chem. W'ks, Newark, N. J.	8.05	2.21	0.96	11.15	0.00	2.72	18.19	1161
1170	Clover Leaf Brand Pure R. B. and Tank M.....	Dunn & Backer, Troy, Ind.....	0.00	7.96	14.64	22.50	4.91	0.00	30.48	1170
1171	Clover Lf. Bd. Superphosphate and R. B. M.....	"	6.31	6.55	9.62	22.48	2.28	0.00	30.82	1171
1172	Clover Leaf Brand Superphosphate.....	"	13.74	4.38	1.24	19.34	0.19	0.00	21.72	1172
1173	Clover Leaf Brand Pure Raw Bone Meal.....	"	0.00	8.42	18.32	26.74	4.40	0.00	31.92	1173
1174	Clover Lf. Bd. Superphs. R. B. and P. M.....	"	5.40	6.11	9.97	21.48	2.28	3.43	33.06	1174
1175	Clover Leaf Brand Am. Superphosphate.....	"	6.91	5.65	4.21	16.77	1.96	0.00	26.05	1175
1176	Clover Lf. Bd. Am. Superphs. and Pot. M.....	"	7.57	4.51	3.83	16.21	1.53	4.10	29.29	1176
1181	Urbana Acidulated Bone.....	Loudenback Fertilizer Co., Urbana, Ohio ...	11.46	4.11	1.16	16.73	0.00	0.00	16.69	1181

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble Phosphate Acid.	Per Cent. Inverted Phosphate Acid.	Per Cent. Insoluble Phosphate Acid.	Per Cent. Total Phosphate Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Estimated Value Per Ton.	Number.
1432	Horsehead Phosphate.....	The Cleveland Dryer Co., Cleveland, O.	7.23	2.70	1.94	11.17	0.00	0.00	11.92	1432
1441	Urbana Animal Tankage and Guano.....	The Loaden Tank Fertilizer Co., Urbana, O.	5.10	2.11	0.14	10.35	0.09	0.22	14.91	1441
1444	Old Reliable Brand Special Wheat Fert.....	S Kaufman & Sons, Indianapolis, Ind.	2.45	3.31	4.75	10.52	4.59	1.41	26.39	1444
1447	World of Good Raw Bone Superphosphate.....	"	7.07	3.09	3.04	13.20	2.95	3.17	23.70	1447
1448	Indiana Sure Growth Superphosphate.....	Thompson & Edwards Fert. Co., Chicago	8.06	3.37	2.35	13.78	2.13	0.00	23.80	1448
1449	Soluble Bone Phosphate.....	"	3.19	3.06	1.36	7.61	1.43	2.93	17.37	1449
1450	No. 4 Dissolved Bone.....	"	0.95	6.54	1.20	8.69	0.00	0.00	8.99	1450
1461	No 1 Dissolved Bone.....	"	4.31	9.22	1.32	15.35	0.00	0.00	16.24	1461
1452	Favorite Bone Phosphate.....	"	2.83	4.99	0.97	8.79	1.97	0.00	13.83	1452
1454	Pure Raw Bone Meal.....	Swift & Company, Chicago, Ill.....	0.00	6.83	20.00	26.83	4.59	0.00	32.55	1454
1458	Buffalo Fertilizer.....	Milsom Rend. and Per. Co., E. Buffalo, N. Y.	5.65	3.74	0.37	9.76	2.59	2.15	23.72	1458
1459	Potato, Tobacco and Hop Phosphate.....	"	6.35	2.63	0.33	9.31	2.73	5.00	26.96	1459
1460	Vegetable Bone Fertilizer.....	"	7.22	2.73	0.37	10.32	5.50	5.01	26.65	1460
1461	Wheat, Oats and Barley Phosphate.....	"	5.74	3.95	0.49	10.18	1.54	2.65	21.66	1461
1462	Erta King.....	"	4.76	3.83	0.24	8.83	1.37	2.25	18.32	1462
1463	Buffalo Guano.....	"	5.31	3.33	0.42	9.06	1.24	4.29	21.18	1463
1464	Dissolved Bone and Potash.....	"	5.99	4.47	0.55	11.01	0.00	1.98	17.35	1464
1465	Cyclone Bone.....	"	0.00	5.33	17.90	23.23	4.58	0.00	30.00	1465
1466	Dissolved Bone.....	"	7.25	4.75	0.55	12.55	0.00	0.00	14.40	1466
1467	Star Brand.....	Dryden Pack. and Prov. Co., Lafayette, Ind.	0.00	3.08	5.04	8.12	10.40	0.55	27.56	1467
1468	Pure Raw Bone.....	Walker, Stratman & Co., Pittsburg, Pa.....	0.00	5.53	16.57	25.10	4.55	0.00	31.22	1468
1469	Butcher's Bone Meal.....	"	0.00	2.78	10.44	13.22	3.35	0.00	19.30	1469
1470	Four Fold.....	"	6.18	3.37	1.82	11.07	1.79	1.84	21.78	1470
1471	Help Mate.....	"	6.51	2.98	0.82	12.31	0.00	0.00	13.79	1471
1472	German Phosphate.....	The Farmer's Fert. Co., Indianapolis, Ind....	0.95	5.42	10.05	16.44	2.75	4.35	26.33	1472

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1479	Powder Brand.....	American Reduction Co., Pittsburgh, Pa.	4.06	2.85	10.23	2.38	2.18	21.30	1479
1480	Anchor Brand Corn and Wheat Grower.	A. B. Meyer Mfg. Co., St. Louis, Mo.	3.88	4.84	11.46	3.89	2.41	26.73	1480
1481	Bradley's Acid Phosphate.	Bradley Fertilizer Co., Boston, Mass.	9.59	0.93	14.62	0.00	0.00	16.43	1481
1482	Ground Bone.....	S. M. Hess & Bro., Philadelphia, Pa.	0.00	15.70	19.96	3.66	0.00	24.96	1482
1483	Soluble Bone	" "	14.17	0.17	17.05	0.00	0.00	23.73	1483
1484	Potato and Truck Manure	" "	3.88	0.92	10.16	3.45	7.27	32.56	1484
1485	Ammoniated Bone Superphosphate	" "	6.74	2.08	11.45	2.33	3.78	26.93	1485
1486	Kemper Phosphate	" "	4.17	2.42	12.72	0.00	1.72	17.94	1486
1487	Keystone Bone Phosphate	" "	7.62	1.98	12.03	1.70	2.51	21.41	1487
1488	Carrie's Soluble Bone	The Carrie Fertilizer Co., Louisville, Ky.	9.63	1.70	12.63	0.98	2.93	22.92	1488
1489	Currie's Butchertown Bone	" "	7.36	4.23	15.52	1.05	1.90	23.77	1489
1490	Powder's Universal Phosphate	American Reduction Co., Pittsburg, Pa.	3.38	1.41	11.62	3.40	2.61	23.71	1490
1491	Buffalo Brand Fine Ground Bone	Dockweiler & Kingsbury, Indianapolis, Ind.	0.00	10.69	14.23	2.67	0.00	17.97	1491
1492	Buffalo Brand Wheat Fertilizer	" "	4.06	9.17	17.34	3.23	1.47	24.25	1492
1493	Mound City Bone Meal	Nolta & Doloh Fertilizer Co., St. Louis, Mo.	0.00	11.00	13.67	2.97	0.00	19.48	1493
1502	Pure Bone Meal.....	Marengo Manufacturing Co., English, Ind.	0.00	12.64	16.65	3.82	0.00	24.52	1502
1503	Dissolved Bone and Potash	" "	4.87	0.64	7.73	4.16	6.81	29.76	1503
1504	Slaughter House Bone	" "	5.06	1.87	9.31	4.40	3.85	29.36	1504
1505	H Half and Half.....	" "	2.97	5.49	10.50	4.34	8.08	34.54	1505
1506	V K Wampler's High Grade Superphos'ite.	V. E. Wampler, Dayton, Ohio.....	11.99	2.00	17.91	0.00	0.00	23.47	1506
1507	V E Wampler's Bone and Potash	" "	9.59	0.73	14.01	0.00	2.17	21.63	1507
1508	Bull Head Brand, Mag's Wheat, Corn, Tobacco, and Vegetable Grower	Interstate Fertilizer Co., Mt. Carmel, Ill.	0.00	5.55	8.10	3.80	1.32	15.65	1508
1509	Bull Head Brand, Raw Bone Meal	Crocker Fert. and Chem. Co., Buffalo, N. Y.	0.00	14.07	17.16	3.83	0.24	23.79	1509
1510	Crocker's Ground Bone Meal	" "	0.00	20.35	29.77	2.66	0.00	23.32	1510
1511	Crocker's Animal Bone and Potash	" "	0.00	10.44	14.19	2.06	1.36	17.76	1511
1512	Crocker's Erie Fertilizer	" "	7.29	2.30	14.69	0.00	0.00	19.81	1512
1513	Crocker's Ammon'd Wheat and Corn Phos	" "	9.35	0.90	14.55	2.73	2.41	30.73	1513
1514	Raw Bone Meal	Marengo Manufacturing Co., English, Ind.	0.00	14.00	19.74	6.39	0.00	29.99	1514
1515	Ammoniated Superphosphate No. 2	F. Mehreng, Bruceville, Md.	6.29	4.03	16.94	1.28	2.07	26.82	1515
1516	Niagara Queen City Phosphate	Niagara Fertilizer Works, Buffalo, N. Y.	10.18	0.88	13.25	0.00	0.00	17.65	1516
1517	Niagara Grain and Grass Grower	" "	5.67	4.10	11.27	1.73	1.53	19.52	1517
1518	Niagara Wheat and Corn Producer	" "	6.90	3.74	11.87	1.94	2.32	22.23	1518
1519	Activated Bone	The Cincinnati Fertilizer Co., Cincinnati, O.	6.36	8.74	16.51	3.66	0.00	29.90	1519
1520	Pure Bone Meal	" "	0.00	16.90	23.25	4.74	0.00	30.56	1520
1521	Indiana Phosphate	" "	3.88	4.40	11.55	4.06	1.35	23.13	1521
1522	Queen City Phosphate	J. B. Jones, Louisville, Ky.	2.15	6.91	13.05	3.33	2.31	25.50	1522
1523	Bromophyte	Marengo Manufacturing Co., English, Ind.	0.46	0.87	3.93	1.49	0.42	9.78	1523
1524	Half and Half.....	Newburgh Fertilizer Co., Cleveland, Ohio	0.04	11.95	16.16	6.74	3.81	34.86	1524
1525	Victor Phosphate.....	Standard Fertilizer Co., Boston, Mass.	4.63	0.77	7.60	1.21	1.44	15.36	1525
1526	Standard A Brand.....	" "	4.18	2.37	10.45	1.15	1.70	18.22	1526

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Estimated Value per Ton.	Number.
1527	Standard Guano	Standard Fertilizer Co., Boston, Mass.	5.39	3.66	2.16	11.21	1.30	4.10	22.79	1527
1528	Standard Ammoniated Dissolved Bone	"	3.66	7.07	3.90	14.63	1.97	3.47	27.46	1528
1529	Standard Dissolved Bone Phosphate	"	6.52	5.73	2.01	14.26	0.00	0.00	18.36	1529
1530	Standard Extra Fine Ground Bone	"	0.00	2.45	13.52	15.97	2.52	0.00	18.51	1530
1531	Cumberland Extra Fine Ground Bone	Cumberland Bone Phos. Co., Boston, Mass.	0.00	2.43	13.52	15.95	2.43	0.00	18.46	1531
1532	Cumberland Dissolved Bone Phosphate	"	6.49	5.83	1.91	14.23	0.00	0.00	18.39	1532
1533	Cumberland Hawkeye Fertilizer	"	4.22	3.90	2.16	10.18	1.23	1.31	17.79	1533
1534	Cumberland Guano	"	5.27	3.90	2.06	11.23	1.09	4.09	22.25	1534
1535	Cumberland Ammoniated Dissolved Bone	"	3.49	7.16	3.90	14.55	1.91	3.50	27.18	1535
1536	Bradley's Alkaline Bone	Bradley Fertilizer Co., Boston, Mass.	6.29	4.56	2.52	13.37	0.00	3.42	20.81	1536
1537	Bradley's Alkaline Bone Phosphate	"	0.00	2.79	14.35	17.14	2.74	0.00	20.22	1537
1538	Bradley's Bone and Potash Mixture	"	3.78	4.67	10.08	18.51	2.98	6.75	34.89	1538
1539	High Grade Bone and Potash Mixture	Southern Indiana Fert. Co., Boonville, Ind.	6.95	2.35	1.22	10.53	4.80	6.75	36.27	1539
1540	Currie's Wheat Special	Jas. McCallum & Co., Dayton, Ohio.	9.97	3.79	0.40	14.16	0.18	0.18	20.26	1540
1541	Currie's Wheat Special	Currie Fertilizer Co., Louisville, Ky.	9.52	2.04	0.95	12.51	0.72	2.13	21.47	1541
1542	Old Reliable Brand P. H. Bone	S. Kaufman & Sons, Indianapolis, Ind.	0.00	5.97	12.87	18.84	4.53	0.00	26.78	1542
1543	Old Reliable Brand Chicago Bone Meal	Thompson & Edward's Fert. Co., Chicago, Ill.	1.20	6.91	13.85	21.96	2.95	0.00	28.56	1543
1544	Pure Fine Ground Bone	"	0.00	6.94	18.95	25.89	3.19	0.00	27.89	1544
1545	Pure Raw Bone Meal	J. M. Miller, Bloomington, Ind.	0.00	6.50	17.83	24.33	4.89	0.00	31.70	1545
1546	Pure Fine Ground Bone Meal	"	0.00	10.10	20.12	30.22	2.38	0.00	28.29	1546
1547	Valley City Wheat Grower	Madison Fert. & Glue Works, Madison, Ind.	2.37	4.73	7.64	14.74	3.69	1.32	27.78	1547
1548	Pure Bone Meal	The Farmers' Fert. Co., Indianapolis, Ind.	0.00	7.23	22.73	29.96	2.47	0.00	28.36	1548
1549	Pure Fine Ground Bone Meal	Thompson & Edward's Fert. Co., Chicago, Ill.	1.43	6.58	10.16	18.17	3.38	9.31	30.22	1549
1550	Hubbard & Co.'s Soluble Bone and Potash	Hubbard & Company, Baltimore, Md.	8.21	2.41	2.11	12.73	0.00	5.11	22.27	1550
1551	Conklin's Bone Fertilizer	P. Conklin, North Vernon, Ind.	1.28	4.70	6.51	14.49	2.51	1.95	23.35	1551

1552	Bone Meal	The Armour Fertilizer Works, Chicago, Ill.	8.37	16.76	25.13	3.33	0.00	29.08	1552
1553	Raw Bone Meal.....	"	7.65	18.09	26.74	4.76	0.00	32.30	1553
1554	Bone and Blood	"	6.96	8.75	14.51	8.00	0.00	34.98	1554
1555	Acidulated Bone Meal	"	9.22	7.80	31.52	3.12	0.10	33.85	1555
1556	IV 14% Acid Phosphate	"	3.33	6.83	16.27	0.00	0.00	11.27	1556
1557	V Ammoniated Bone with Potash.....	"	3.94	2.26	11.87	2.79	2.60	26.30	1557
1558	Grain Grower	"	4.49	0.87	11.39	2.59	2.13	25.58	1558
1559	Bone, Blood and Potash.....	"	3.64	1.96	11.40	6.65	7.53	40.26	1559
1560	All Soluble	"	6.07	4.14	13.18	4.04	4.84	33.07	1560
1561	D & K. Crop Grower	Dockweiler & Kingsbury, Indianapolis, Ind.	8.63	11.21	19.34	3.56	1.90	27.75	1561
1562	Crocker's Ground Bone Meal.....	Crocker Fert. & Chemical Co., Buffalo, N. Y.	10.21	19.65	29.86	2.66	0.00	28.38	1562
1563	Crocker's Erie Fertilizer	"	5.70	2.43	15.33	0.00	0.00	15.48	1563
1564	Crocker's Niagara Phosphate	"	2.11	0.04	13.09	0.00	0.00	15.56	1564
1565	Crocker's Animal Bone and Potash.....	"	4.21	9.75	13.96	2.05	1.35	17.54	1565
1566	Crocker's Superior Alkaline Bone	"	2.45	0.13	11.69	0.00	1.38	17.92	1566
1567	Crocker's New Rival Am'd Superphosphate	"	3.22	1.01	11.28	1.51	1.66	21.51	1567
1568	Crocker's Potato, Hop & Tobacco Phosphate	"	1.96	0.77	11.16	2.52	3.42	26.67	1568
1569	Crocker's Universal Grain-Grower	"	1.99	0.51	7.43	1.17	3.62	17.85	1569
1570	Crocker's Practical Am'd Superphosphate	"	2.74	1.33	9.56	1.15	1.33	17.37	1570
1571	Crocker's Am'd W't and Corn Phosphate	"	2.51	1.28	11.54	2.46	1.96	24.86	1571
1572	Crocker's General Crop Phosphate.....	"	1.86	0.81	8.06	1.28	1.43	16.13	1572
1573	Fine-Ground Bone	The Jones Fertilizing Co., Cincinnati, Ohio.	6.11	13.73	24.84	4.12	0.00	29.75	1573
1574	Jewel Phosphate.....	"	2.30	2.94	12.98	2.09	0.00	22.09	1574
1575	Acidulated Bone	"	4.76	5.19	16.92	3.48	0.00	29.98	1575
1576	Pure Raw Bone Meal.....	"	5.65	19.96	25.84	4.55	0.00	31.60	1576
1577	Ammoniated Bone Meal	"	7.06	10.00	17.90	5.49	0.00	33.53	1577
1578	VI "Jones's" Radiator	"	4.08	2.44	8.93	2.60	1.75	20.45	1578
1579	VII Tobacco and Potato Grower	"	1.86	1.46	9.58	4.17	3.10	30.87	1579
1580	VIII Special Tobacco Grower	"	3.30	4.13	11.40	2.53	2.99	23.83	1580
1581	IX, Miami Valley Phosphate	"	3.58	4.20	11.55	2.56	2.71	23.74	1581
1582	D. & K. Quick-Acting Wheat and Corn Grower.....	Dockweiler & Kingsbury, Indianapolis, Ind.	3.71	4.49	17.30	2.40	1.83	30.02	1582
1583	M. E. Wheeler & Co.'s High-Grade Fruit Fertilizer	M. E. Wheeler & Co., Rutland, Vt.....	0.93	0.33	12.42	0.00	8.82	27.71	1583
1584	Horse Shoes Brand Fine Raw Bone	Northwestern Fertilizing Co., Chicago, Ill.	6.96	15.68	22.61	4.47	0.00	29.26	1584
1585	Horse Shoes Brand Pure Ground Bone	"	7.47	12.26	19.73	4.17	0.00	26.32	1585
1586	Horse Shoes Brand National Bone Dust.....	"	3.17	3.13	11.43	2.76	0.99	23.04	1586
1587	Horse Shoes Brand Gar. City Superphosphate.....	"	3.31	3.03	11.51	2.89	0.97	23.52	1587
1588	Horse Shoes Brand Challenge Corn Grower	"	3.48	3.07	11.62	2.72	0.94	23.10	1588
1589	Horse Shoes Brand Sup. and Raw Bone Mixture	"	4.35	7.05	14.98	3.27	0.87	28.19	1589

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble	Per Cent. Reverted	Per Cent. Insoluble	Per Cent. Total	Per Cent. of Am-	Per Cent. of Potash	Estimated Value per Ton.	Number.
			Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	Phosphoric Acid.	monia.	Phosphoric Acid.		
1590	Horse Shoe Brand 26-Dollar Phosphate.	Northwestern Fertilizing Co., Chicago, Ill.	3.71	2.85	4.57	11.13	2.76	0.53	20.84	1590
1591	Horse Shoe Brand Prairie Phosphate.	"	3.80	2.56	4.71	11.07	2.88	0.52	21.02	1591
1592	Horse Shoe Brand Ky-Ana Phosphate.	"	4.25	2.91	2.03	9.19	1.42	0.66	16.29	1592
1593	Horse Shoe Brand Quick-Acting Phosphate.	"	9.25	3.94	2.44	15.63	0.00	0.00	15.83	1593
1594	Horse Shoe Brand Dissolved Bone Phosphate.	"	8.57	3.98	0.81	13.36	1.48	0.00	22.50	1594
1595	Horse Shoe Brand Bone and Potash.	"	8.00	3.67	3.42	15.10	0.00	1.08	19.69	1595
1596	Horse Shoe Brand Acid'ed Bone & Potash.	"	7.15	3.22	2.07	12.44	1.02	2.69	22.05	1596
1597	Horse Shoe Brand Acidulated Bone.	"	7.94	3.51	2.06	13.51	1.02	0.00	20.33	1597
1598	Golden Harvest Bone Meal.	Globe Fertilizer Co., Louisville, Ky.	7.93	2.34	3.38	13.65	3.94	0.00	28.23	1598
1599	X. Progress Phos Corn & Wheat Grower.	"	6.36	2.70	3.11	12.17	1.56	0.99	20.42	1599
1600	Eagle Corn and Wheat Grower.	"	8.09	1.82	1.22	11.13	2.94	2.77	26.75	1600
1601	Bone and Potash.	"	11.03	2.32	1.11	14.46	0.51	1.60	22.81	1601
1602	Globe Bone Dust.	"	8.57	2.99	1.66	13.22	1.65	0.53	22.77	1602
1603	Globe Wheat Grower.	"	8.19	1.66	1.92	11.57	2.70	2.77	26.29	1603
1604	Raw Bone Meal.	A. Hopkins & Co., New Albany, Ind.	0.00	7.30	15.22	22.52	4.89	0.00	30.43	1604
1605	Pure Ground Bone.	The Jarecki Chemical Co., Sandusky, Ohio.	0.00	4.73	16.12	20.85	5.36	0.00	30.68	1605
1606	C. O. D. Phosphate.	"	16.18	2.56	1.83	20.57	0.00	0.00	22.49	1606
1607	Dissolved Bone Black Wheat Special.	"	15.84	3.76	2.92	22.52	0.00	0.00	23.52	1607
1608	Lake Erie Fish Guano.	"	13.61	3.33	1.48	18.45	3.10	2.58	37.02	1608
1609	Double Fish Guano.	"	12.17	2.98	1.15	16.30	4.02	2.52	36.96	1609
1610	Super phosphate.	"	14.06	3.13	1.45	18.64	2.27	1.42	33.45	1610
1611	Fish and Potash Tobacco and Potato Food.	"	12.38	4.16	1.79	18.33	2.73	5.15	38.60	1611
1612	Bone and Phosphate Mixture.	"	6.26	5.93	3.62	20.81	3.63	1.39	34.80	1612
1613	Old Times Raw Bone Meal.	A. Hopkins & Co., New Albany, Ind.	0.00	6.67	15.74	22.41	4.84	0.00	29.61	1613
1614	Ammoniated Bone with Potash.	Armour Fertilizer Works, Chicago, Ill.	5.01	3.36	4.40	12.77	4.09	2.30	29.39	1614

TABLE OF FERTILIZERS—Continued.

NAME OF FERTILIZERS		MANUFACTURERS		Per Cent. Soluble Phosphoric Acid	Per Cent. Reverted Phosphoric Acid	Per Cent. Insoluble Phosphoric Acid	Per Cent. Total Phosphoric Acid	Per Cent. of Am- monia	Per Cent. of Potash	Estimated Value per Ton.	Number.
1653	Homestead Potato Grower	Michigan Carbon Works, Detroit, Mich	7.68	1.30	1.02	10.00	2.51	6.52	28.54	1653	
1654	Homestead Corn and Wheat Grower	"	7.68	1.55	1.70	10.91	3.02	2.21	25.63	1654	
1655	Darling's Ground Raw Bone	Darling & Co., Chicago, Illinois	0.00	7.62	17.07	24.69	4.90	0.00	31.98	1655	
1656	Darling's Pure Ground Bone	"	0.00	7.80	18.04	25.84	3.44	0.00	28.41	1656	
1657	Darling's Farmer's Favorite Brand	"	2.43	6.90	5.36	14.69	4.44	5.19	35.83	1657	
1658	Chicago Brand	"	3.10	8.00	4.64	15.74	3.65	3.70	30.91	1658	
1659	Sure Winner Brand	"	3.07	5.77	5.05	13.89	3.32	6.96	32.72	1659	
1660	Minim Valley Phosphate	The Jones Fertilizing Co., Cincinnati, Ohio.	2.85	3.51	5.03	11.39	3.10	2.70	21.46	1660	
1661	Tobacco and Potato Grower	"	3.97	2.87	4.71	11.55	5.38	5.97	35.65	1661	
1662	Special Tobacco and Potato Grower	"	2.91	3.59	4.70	11.23	3.10	2.93	24.78	1662	
1663	Jones's Reliance	"	2.55	3.51	4.07	10.13	3.02	1.52	21.81	1663	
1664	Horse Shoe Brand Corn and Wheat Grower	North Western Fertilizing Co., Chicago, Ill	8.38	2.86	1.98	13.02	3.06	1.51	27.64	1664	
1665	N. V. Bradley's Com Man. for Po & Vegg.	Bradley Fertilizer Co., Boston, Mass	4.67	5.01	2.39	12.10	3.78	4.98	32.34	1665	
1666	Urbana Animal Tankage and Urano No. 1	The Loudonback Fertilizer Co., Urbana, U	8.00	3.49	0.51	12.00	1.91	3.16	25.97	1666	
1667	Pure Bone with Potash	Walton Fertilizer Co., Warren, Ohio	0.00	2.71	11.51	14.25	2.83	2.87	21.98	1667	
1668	Ontario Fish Guano with Potash	"	4.96	4.70	3.59	13.27	2.83	2.66	26.79	1668	
1669	Wheat and Grass Grower	"	5.58	4.41	3.63	13.62	1.81	1.77	23.81	1669	
1670	Diamond Cereals Bone Black and Potash	"	5.81	9.54	0.77	16.12	0.00	4.35	27.17	1670	
1671	Diamond Cereals Soluble Bone	"	3.57	10.67	3.77	18.01	1.05	0.00	25.35	1671	
1672	Special Dissolved Bone Phosphate	"	9.79	8.41	1.13	14.33	0.00	0.00	15.84	1672	
1673	Half and Half	S. Kaufman & Sons, Indianapolis, Ind	5.09	4.78	7.37	17.24	2.60	0.00	26.04	1673	
1674	Soluble Bone and Potash	"	3.63	4.42	5.56	13.61	2.16	1.98	23.43	1674	
1675	Bowker's Harvest Bone Dis. with Potash.	Bowker Fertilizer Co., Boston, Mass	5.97	4.71	4.39	15.07	0.29	1.17	19.86	1675	
1676	Bowker's Dis. Bone Phos. with Potash	"	3.66	7.24	4.14	15.24	0.28	1.17	20.27	1676	
1677	Packing House Fertilizer	Thompson & Edwards Fer. Co., Chicago, Ill	0.00	9.99	8.02	12.01	5.15	0.84	24.37	1677	

1678	Potato Special	American Reduction Co., Pittsburg, Pa.	1.47	1.71	0.82	4.00	4.51	9.98	30.45	1678
1679	Ground Steamed Bone	Swift & Company, Chicago, Ill.	0.00	9.26	18.19	27.45	3.16	0.00	28.70	1679
1680	Bone Tankage	"	0.00	6.91	11.77	18.68	6.21	0.00	31.71	1680
1681	Bone and Potash	"	0.00	6.73	17.01	25.74	3.13	2.99	31.00	1681
1682	Bone Tankage and Potash	"	0.00	6.89	10.41	17.30	5.74	2.92	32.83	1682
1683	Super-Phosphate	"	1.09	4.73	12.14	17.96	2.82	2.86	27.08	1683
1684	Tobacco Grower	"	0.00	4.64	9.07	13.71	4.34	3.79	27.29	1684
1685	Bowker's Ammoniated O. L. O. Phosphate	Bowker Fertilizer Co., Boston, Mass.	5.10	6.57	3.08	15.85	0.73	0.00	23.74	1685
1686	Pig's Foot Brand Chicago Bone Meal	Thompson & Edwards Fer. Co., Chicago, Ill.	0.00	4.43	17.01	21.44	3.70	2.19	28.74	1686
1687	Currie's Kentucky Phosphate	The Currie Fertilizer Co., Louisville, Ky.	7.39	2.82	1.04	14.25	0.78	2.36	20.11	1687
1688	Currie's Soluble Bone	"	12.19	1.72	0.81	14.72	0.57	2.22	24.33	1688
1689	Currie's Special for Oats, Corn and Grass	"	8.35	2.39	2.52	13.16	1.15	3.47	24.02	1689
1690	Bradley's Com. Man. for Potatoes & Veggies	Bradley Fertilizer Co., Boston, Mass.	5.43	3.21	2.06	10.70	4.35	6.56	34.25	1690
1691	Ruby Phosphate	Jan. McCallum & Co., Dayton, Ohio	8.96	4.78	4.45	18.19	1.53	0.00	26.50	1691
1692	Superior Pure Ground Bone with Potash	"	0.00	6.17	12.97	19.14	5.40	3.22	33.46	1692
1693	Miami Phosphate	"	8.83	4.22	3.99	17.04	1.59	1.96	27.79	1693
1694	Ammoniated Dissolved Bone	"	7.00	4.37	4.14	15.41	2.63	3.51	30.38	1694
1695	Raw Bone and Phosphate (Half and Half)	"	5.21	4.75	8.21	16.17	2.33	4.22	32.72	1695
1696	High Grade Tobacco and Potato Special	"	7.39	2.69	1.59	11.67	3.78	6.30	33.97	1696
1697	Spot Cash Fertilizer	"	6.80	4.91	4.62	16.53	2.25	2.45	28.99	1697
1698	Indian Brand Gilead Phosphate	Geo. S. Bartlett, Cincinnati, Ohio	3.38	2.52	9.36	15.76	3.04	2.39	26.56	1698
1699	Anchor Brand Pure Bone Meal	A. B. Mayer, Mfg. Co., St. Louis, Mo.	0.00	5.80	16.61	22.41	3.95	0.00	27.54	1699
1700	World of Good Raw Bone Corn Grower	Thompson & Edwards Fert. Co., Chicago, Ill.	3.17	8.16	9.35	20.58	2.73	6.30	37.16	1700
1701	XV. Packing House Bone	Brown's Seed Store Co., New Albany, Ind.	0.32	5.43	5.23	11.01	3.77	8.38	32.57	1701
1702	Hooper Bone	Griffith & Keller, Columbus, Ind.	0.29	5.22	5.80	11.31	5.70	0.00	28.29	1702
1703	Ohio Valley Phosphate	Geo. S. Bartlett, Cincinnati, Ohio	7.10	3.37	3.79	14.25	2.34	1.79	26.10	1703
1704	Cyclone Bone	Milsum Bend. and Fer. Co., E. Buffalo, N. Y.	0.00	6.42	17.63	24.05	4.72	0.00	31.00	1704
1705	Dissolved Bone	"	10.77	1.88	0.26	12.91	0.00	0.00	15.18	1705
1706	Dissolved Bone and Potash	"	8.71	2.16	0.22	11.09	0.00	2.46	18.30	1706
1707	Buffalo Brand	"	7.38	1.75	0.21	9.35	1.30	4.45	22.15	1707
1708	Erie King	"	7.14	1.72	0.26	9.12	1.40	3.51	20.97	1708
1709	Wheat, Oats and Barley Phosphate	"	8.38	1.54	0.28	10.13	2.10	2.99	23.74	1709
1710	Vegetable Bone Fertilizer	"	9.52	0.90	0.26	10.68	5.44	5.52	37.69	1710
1711	Potato, Hot and Tobacco Phosphate	"	7.98	1.98	0.27	10.17	3.12	4.40	28.68	1711
1712	Buffalo Fertilizer	"	8.10	1.91	0.28	10.29	3.96	3.25	27.02	1712
1713	Corn Fertilizer	"	8.75	1.16	0.23	10.14	3.62	2.42	27.78	1713
1714	Anchor Brand Pure Bone Meal	A. B. Mayer Mfg. Co., St. Louis, Mo.	0.00	6.96	17.23	23.19	4.81	0.00	30.68	1714
1715	Packing House Bone	Brown's Seed Store Co., New Albany, Ind.	0.46	4.49	6.40	11.35	4.56	3.96	29.19	1715
1716	D & K. Dissolved Bone and Potash	Deckweiler & Kingsbury, Indianapolis, Ind.	3.35	2.77	5.56	11.58	2.15	2.42	21.12	1716
1717	Soft Bone	Charles E. St. John, Greensburg, Ind.	0.00	6.86	15.08	21.88	3.76	0.00	26.60	1717

TABLE OF FERTILIZERS—Continued.

Number.	NAME OF FERTILIZERS.	MANUFACTURERS.	Per Cent. Soluble Phosphoric Acid.	Per Cent. Reverted Phosphoric Acid.	Per Cent. Insoluble Phosphoric Acid.	Per Cent. Total Phosphoric Acid.	Per Cent. of Ammonia.	Per Cent. of Potash.	Estimated Value per Ton.	Number.
1718	Increscent Brand Pure Fine Ground Bone	P. B. Mathieson & Co., St. Louis, Mo.	0.00	7.53	16.55	24.08	4.04	0.00	28.96	1718
1719	Increscent Brand Acidulated Pure Bone Meal	"	3.67	6.78	6.97	19.42	3.89	0.00	33.28	1719
1720	Increscent Brand Ammoniated Bone Meal	"	2.48	6.13	5.32	15.93	5.57	0.00	34.76	1720
1721	Increscent Brand Acidulated Bone with Potash	"	2.69	6.75	4.96	14.30	3.89	2.81	31.21	1721
1722	Increscent Brand St. Louis Phosphate	"	1.94	4.95	4.36	11.19	3.62	2.52	26.06	1722
1723	Increscent Brand Dissolved Bone	"	2.46	6.55	4.84	13.85	4.27	4.30	31.49	1723
1724	Lindley's Bone and Potash Wheat Grower	"	3.21	4.74	4.92	12.77	3.15	2.13	26.03	1724
1725	Fine Raw Bone Fertilizer	Robert Bausback, Shelbyville, Ind.	0.00	5.39	16.94	22.23	4.25	0.00	28.31	1725
1726	Cumberland Bone and Potash	Cumberland Bone Phosphate Co., Boston, M.	6.60	4.56	0.75	11.91	0.00	2.57	19.16	1726
1727	Indiana Brand Ground Phosphate	George S. Burlett, Cincinnati, Ohio	4.22	3.83	5.87	13.92	3.23	2.16	27.07	1727
1728	Lister's Special Wheat Fertilizer	Lister's Agricul Chem. Works, Newark, N. J.	6.97	3.40	1.64	12.15	2.01	3.19	25.47	1728
1729	Fish and Potash Grain Special	The Jarecki Chemical Co., Sandusky, Ohio	6.95	4.33	0.82	12.10	1.84	4.30	25.46	1729
1730	O. K. Fertilizer	"	4.00	3.93	0.57	5.60	0.55	0.69	13.96	1730
1731	AVI A A Dissolved Bone	Read Fertilizer Co., Charleston, S. C.	10.14	2.33	2.89	15.36	0.00	0.00	14.96	1731
1732	Acetylene Bone Phosphate	S. M. Hess & Bro., Philadelphia, Pa.	1.99	7.36	2.24	11.59	1.65	1.54	21.23	1732
1733	Soluble Bone	"	12.29	3.13	0.84	16.30	0.00	0.00	18.50	1733
1734	Bone Meal	Louisville Fertilizer Works, Louisville, Ky.	0.00	8.46	5.49	13.95	4.58	0.00	23.45	1734
1735	Bowker's Dissolved Bone Phosphate	Bowker Fertilizer Co., Boston, Mass.	9.99	2.67	2.85	15.51	0.00	0.00	15.19	1735
1736	Acid Phosphate or Dissolved S. C. Bone	The Raisin Fertilizer Co., Baltimore, Md.	12.29	3.79	1.28	17.36	0.00	0.00	19.30	1736
1737	Bone and Potash	"	7.04	5.03	3.13	15.20	0.00	1.16	20.17	1737
1738	Coarse Raw Bone	Thompson & Edward's Fert. Co., Chicago, Ill.	0.00	5.36	17.35	22.71	5.05	0.00	31.06	1738
1739	Pure Fine Ground Bone	"	0.00	7.83	18.11	25.94	3.19	0.00	27.74	1739
1740	Indiana Sure Growth Phosphate	"	9.35	3.13	0.58	13.06	2.13	3.57	26.49	1740
1741	Bull Dog Phosphate	The Western Union Chem. Co., Cleveland, O.	7.32	3.90	0.95	12.17	0.00	0.00	13.46	1741
1742	Common Sense	The American Reduction Co., Pittsburg, Pa.	2.00	2.8	2.52	7.11	3.57	1.96	21.00	1742
1743	Currie's Fine Ground Raw Bone Meal	The Currie Fertilizer Co., Louisville, Ky.	0.68	9.13	13.53	23.54	2.34	0.31	23.87	1743
1744	Currie's Wheat Special	"	6.53	5.10	1.41	13.09	0.34	0.16	18.41	1744

EXPLANATION OF THE TABLE.

In the table the attempt is made to give the name and composition of every fertilizer on sale in the State at the date of printing this bulletin. Letters were sent to every manufacturer doing business in the State, asking them to furnish us with the list of brands they would offer for sale here during the coming year. If any omissions are found in the table, it is because the manufacturers' replies to these letters have not been received.

The tables contain an "*estimated value per ton.*" It is important to note what is intended by this. No attempt is made to state the *agricultural* value of the fertilizer, or the return which a farmer may expect from a given quantity of any brand. The agricultural value would depend on many varying conditions, such as the crop to be raised, the composition and condition of the soil, the time and manner of applying the fertilizer, the amount of rainfall and sunshine, the temperature of the season, the drainage, and other conditions.

The "*estimated value per ton*" is intended to mean the *commercial* value; that is, the sum for which a ton of the sample could be made and put on the market. The figures are only approximate, and are probably rather above the selling price of the goods. In computing these valuations the following values were given to the various ingredients:

In plain superphosphates—

Available phosphoric acid 6 cents per pound.
Insoluble " " nothing.

In acidulated mixed goods—

Soluble phosphoric acid 7 cents per pound.
Reverted " " 7 " "
Insoluble " " 3 " "

In bone, tankage, etc. —

Total phosphoric acid 3½ cents per pound.

In all goods—

Ammonia 15 cents per pound.
Potash soluble in water 6 " "

In order to find the estimated value per ton the following simple rules may be observed:

In plain superphosphates—

Multiply \$1.20 by the per cent. of soluble phosphoric acid.
" 1.20 " " reverted " "

Add together the numbers so obtained, and the sum is the estimated value of a ton of the goods.

In acidulated mixed goods—

Multiply \$1.40 by the per cent. of soluble phosphoric acid.
" 1.40 " " reverted " "
" .60 " " insoluble " "
" 3.00 " " ammonia " "
" 1.20 " " potash " "

Add together the numbers so obtained, and the sum is the estimated commercial value of a ton of the goods.

In bone, bone and potash, tankage, etc.—

Multiply \$0.70 by the per cent. of total phosphoric acid.

“ 3.00 “ “ ammonia.

“ 1.20 “ “ potash.

Thus suppose the tag on a plain acid phosphate shows the goods to contain :

Soluble phosphoric acid 11.99 per cent.

Reverted “ “ 3.92 per cent.

Then

$$\$1.20 \times 11.99 = \$14.39.$$

$$1.20 \times 3.92 = 4.70.$$

Estimated value per ton, \$19.09.

If the tag shows that the acidulated mixed fertilizer contained :

Soluble phosphoric acid 4.25 per cent.

Reverted “ “ 5.50 “

Insoluble “ “ 2.02 “

Ammonia 2.02 “

Potash 2.23 “

$$\$1.40 \times 4.25 \$5.95$$

$$1.40 \times 5.50 7.70$$

$$.60 \times 2.02 1.25$$

$$3.00 \times 2.02 6.06$$

$$1.20 \times 2.23 2.68$$

Estimated value per ton \$23 64

For a bone the sum of the phosphoric acid must be used. If the tag read :

“ Reverted ” phosphoric acid 5.22 per cent.

Insoluble “ “ 16.22 “

Ammonia “ “ 5.43 “

The total phosphoric acid would be 21.44 “

And the calculation would be—

$$\$0.70 \times 21.44 \$14.91$$

$$3.00 \times 5.43 16.29$$

Estimated value per ton \$31.20

The legal standard of all fertilizers sold in Indiana is the analysis printed on the tag of the State Chemist attached to the sack. The indefinite “guaranteed analysis” sometimes printed on the sacks has no standing under the Indiana law. If there are no State Chemist’s tags attached to the goods, the goods are not legally on sale, and no good citizen should become a party to the violation of a law intended to protect the rights of purchasers of fertilizers. Unless the goods have tags attached you have no legal guarantee that the goods contain any valuable fertilizer ingredients, and all dealers selling such goods are liable to heavy fines. Contraband goods are always open to suspicion.

REPORT ON

FARMERS' INSTITUTES

UNDER THE AUSPICES OF

Purdue University School of Agriculture

FOR THE INSTITUTE SEASON OF 1896-7.

The eighth institute season opened November 30, 1896, and closed February 27, 1897. Institutes were held in the several counties according to the schedule given below. During each of the last four years institutes have been held in every county of the State in accordance with the schedules carefully prepared in the Superintendent's office. In addition, several counties have held independent meetings each year which they were not required to report to the central office. It is believed that this record is not excelled, if equaled, in any other State. Extracts from the reports of secretaries given below show that the interest in the institute work is well maintained. Taken as a whole the institute season will compare favorably with any previous one, although quite a number of the earlier meetings were not nearly as successful as they should have been. In almost every case the reports of the institute workers show that a lack in attendance or interest was due primarily to imperfect preparation for the meeting. The minds of all were engrossed in the political campaign, and in a few instances it seemed difficult to awaken an interest on the part of the local officers in time to prepare thoroughly for some of the earlier meetings. In a few instances the correspondence of the office shows that there was some lack of interest on the part of farmers owing to the depressed price of farm products. In a number of counties the work was far more successful than in any previous year. The very best results are being achieved where local meetings in addition to the annual institutes are being held in various parts of the county. In this way the work is being brought to the notice of farmers generally through their wide-awake, successful fellow-farmers. There is yet much room for progress and it is hoped the more intelligent and enterprising

farmers will recognize that their united efforts are necessary to interest the rank and file of the farmers in this work for their betterment. A very gratifying feature of the past season's work is the interest taken and preparation made by local institute workers.

The time and place of meeting and speakers assigned for each county are shown in the accompanying schedule:

SCHEDULE OF FARMERS' INSTITUTES FOR THE SEASON OF 1896-'97.

DECEMBER.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Brown, Nashville	Tuesday, 1st	E. H. C. Ins., J. J. W. Billingsley
S. A. Miller, Sec.) Nashville	Wednesday, 2d	E. H. C. Ins., J. J. W. Billingsley
Orange, Orleans	Monday, Nov. 30th	M. Truster, H. F. McMahon.
W. H. Talbott, Orleans	Tuesday, Dec. 1st	M. Truster, H. F. McMahon.
Lawrence, Bedford	Wednesday, 2d	M. Truster, H. F. McMahon.
R. B. Scott, Bedford	Thursday, 3d	M. Truster, H. F. McMahon.
Jackson, Brownstown	Friday, 4th	M. Truster, H. F. McMahon.
O. M. Foster, Seymour	Saturday, 5th	M. Truster, H. F. McMahon.
Warrick, Boonville	Monday, Nov. 30th	J. Q. A. Sugg, A. O. Lockridge.
M. M. Rice, Dickeyville	Tuesday, Dec. 1st	J. Q. A. Sugg, A. O. Lockridge.
Spencer, Chrieney	Wednesday, 2d	J. Q. A. Sugg, A. O. Lockridge.
P. A. Atkinson, Midway	Thursday, 3d	J. Q. A. Sugg, A. O. Lockridge.
Perry, Tobinsport	Friday, 4th	J. Q. A. Sugg, A. O. Lockridge.
J. J. Wheeler, Rome	Saturday, 5th	J. Q. A. Sugg, A. O. Lockridge.
Vanderburgh, Kratzville	Monday, Nov. 30th	James Riley, J. C. Stevens.
A. E. Swope, Zippa	Tuesday, Dec. 1st	James Riley, J. C. Stevens.
Pike, Winslow	Wednesday, 2d	James Riley, J. C. Stevens.
M. L. Heathman, Glenen	Thursday, 3d	James Riley, J. C. Stevens.
Davies, Montgomery	Friday, 4th	James Riley, J. C. Stevens.
Isaac Fegan, Montgomery	Saturday, 5th	James Riley, J. C. Stevens.
Dekalb, Butler	Monday, Nov. 30th	J. N. Babcock, S. H. Todd.
R. M. Lockhart, Waterloo	Tuesday, Dec. 1st	J. N. Babcock, S. H. Todd.
Noble, Albion	Wednesday, 2d	J. N. Babcock, S. H. Todd.
Rufus Myers, Rome City	Thursday, 3d	R. M. Kellogg, S. H. Todd.
Elkhart, Goshen	Friday, 4th	R. M. Kellogg, S. H. Todd.
J. E. Thompson, Benton	Saturday, 5th	R. M. Kellogg, S. H. Todd.
Benton, Fowler	Friday, 4th	G. C. Learning, J. J. W. Billingsley
J. M. Rodman, Fowler	Saturday, 5th	G. C. Learning, J. J. W. Billingsley
Ohio, Laughery	Monday, 7th	R. M. Kellogg, W. F. Brown.
H. B. Steele, Pate	Tuesday, 8th	R. M. Kellogg, W. F. Brown.
Switzerland, Vevay	Wednesday, 9th	R. M. Kellogg, W. F. Brown.
Mrs. S. O. N. Pleasant, Vevay	Thursday, 1st	R. M. Kellogg, W. F. Brown.
Jefferson, Canaan	Friday, 2nd	R. M. Kellogg, W. F. Brown.
John Chapman, Lancaster	Saturday, 3rd	R. M. Kellogg, W. F. Brown.
Monroe, Bloomington	Monday, 7th	G. C. Learning, H. F. McMahon.
G. R. Campbell, Bloomington	Tuesday, 8th	G. C. Learning, H. F. McMahon.
Owen, Spencer	Wednesday, 9th	G. C. Learning, H. F. McMahon.
F. D. Badger, Spencer	Thursday, 10th	G. C. Learning, H. F. McMahon.
Green, Bloomfield	Friday, 11th	G. C. Learning, H. F. McMahon.
Jas. Lyons, Bloomfield	Saturday, 12th	G. C. Learning, H. F. McMahon.
Dearborn, Guilford	Monday, 7th	S. H. Todd, J. C. Stevens.
C. P. Ward, Guilford	Tuesday, 8th	S. H. Todd, J. C. Stevens.
Ripley, Osgood	Wednesday, 9th	S. H. Todd, J. C. Stevens.
T. G. Day, Correct	Thursday, 10th	S. H. Todd, J. C. Stevens.
Jennings, North Vernon	Friday, 11th	S. H. Todd, J. C. Stevens.
H. R. Weeks, North Vernon	Saturday, 12th	S. H. Todd, J. C. Stevens.
Carroll, Flora	Monday, 7th	A. O. Lockridge.
S. T. Sterling, Camden	Tuesday, 8th	Mrs. W. W. Stevens.
Montgomery, Crawfordsville	Wednesday, 9th	A. O. Lockridge.
J. M. Harshbarger, Ladoga	Thursday, 10th	Mrs. W. W. Stevens.
Vermillion, Dana	Friday, 11th	A. O. Lockridge.
W. C. Cooke, Quaker	Saturday, 12th	Mrs. W. W. Stevens.

FARMERS' INSTITUTES—Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Dubois, Huntingburg	Monday, 7th.	T. E. Bowles, E. M. C. Hobbs.
S. H. Stewart, Ireland	Tuesday, 8th.	T. E. Bowles, E. M. C. Hobbs.
Martin, Shoals	Wednesday, 9th	T. E. Bowles, E. M. C. Hobbs.
J. M. Sierleck, Shoals	Thursday, 10th	T. E. Bowles, E. M. C. Hobbs.
Sullivan, Sullivan	Friday, 11th	T. E. Bowles, E. M. C. Hobbs.
G. F. Bette, Sullivan.	Saturday, 12th.	T. E. Bowles, E. M. C. Hobbs.
Scott, Scotts Fork	Monday, 7th.	O. F. Lane, Jas. Riley.
J. H. McCullough, Scottsburg	Tuesday, 8th.	O. F. Lane, Jas. Riley.
Crawford, Grantstark	Wednesday, 9th	O. F. Lane, Jas. Riley.
J. E. Jones, English	Thursday, 10th	O. F. Lane, Jas. Riley.
Clark, Charlestown.	Friday, 11th	O. F. Lane, Jas. Riley.
W. W. Herman, Borden.	Saturday, 12th.	O. F. Lane, Jas. Riley.
Shelby, Shelbyville	Friday, 11th	E. H. Collins, D. B. Johnson.
B. S. Sutton, Shelbyville.	Saturday, 12th	E. H. Collins, D. B. Johnson.
Decatur, Lett's Corner.	Monday, 14th	Cal. Husselman, Jas. Riley.
John Stuart, Lett's Corner	Tuesday, 15th	Cal. Husselman, Jas. Riley.
Bartholomew, Hope	Wednesday, 16th	Cal. Husselman, Jas. Riley.
Samuel H. Hook, Hope.	Thursday, 17th.	Cal. Husselman, Jas. Riley.
Harrison, Corydon	Monday, 14th	R. M. Kellogg, J. H. Brigham.
J. Q. A. Sieg, Corydon	Tuesday, 15th	R. M. Kellogg, J. H. Brigham.
Floyd, Edwardsville	Wednesday, 16th	R. M. Kellogg, J. H. Brigham.
H. Tresenriter, Georgetown	Thursday, 17th	R. M. Kellogg, J. H. Brigham.
Washington, Salem.	Friday, 18th	R. M. Kellogg, J. H. Brigham.
E. M. C. Hobbs, Salem	Saturday, 19th	R. M. Kellogg, J. H. Brigham.
Wayne, Centerville	Monday, 14th	S. H. Todd, E. E. Elliott.
J. A. Commons, Centerville	Tuesday, 15th	S. H. Todd, E. E. Elliott.
Union, Liberty	Wednesday, 16th	S. H. Todd, E. E. Elliott.
A. E. Kitchel, Liberty	Thursday, 17th.	S. H. Todd, E. E. Elliott.
Franklin, Brookville	Friday, 18th	S. H. Todd, E. E. Elliott.
Perry Schultz, Oxford, Ohio.	Saturday, 19th	S. H. Todd, E. E. Elliott.
Clay, Bowling Green	Monday, 14th	J. J. W. Billingsley, T. E. Bowles.
M. B. Frump, Bowling Green	Tuesday, 15th	J. J. W. Billingsley, T. E. Bowles.
Vigo, Terre Haute	Wednesday, 16th	J. J. W. Billingsley, T. E. Bowles.
W. W. Vagh, Terre Haute	Thursday, 17th.	J. J. W. Billingsley, T. E. Bowles.
Parke, Rockville	Friday, 18th	J. J. W. Billingsley, T. E. Bowles.
H. C. Vestal, Montezuma	Saturday, 19th	J. J. W. Billingsley, T. E. Bowles.
Allen, Fort Wayne	Monday, 14th	O. F. Lane, D. B. Johnson.
Alex. Johnson, Fort Wayne	Tuesday, 15th	O. F. Lane, D. B. Johnson.
Hamilton, Noblesville	Wednesday, 16th	O. F. Lane, D. B. Johnson.
W. M. Young, Noblesville	Thursday, 17th	O. F. Lane, D. B. Johnson.
Hendricks, Plainfield	Friday, 18th	O. F. Lane, D. B. Johnson.
J. M. Bradw, Plainfield	Saturday, 19th	O. F. Lane, D. B. Johnson.
Grant, Marion	Monday, 14th	A. O. Lockridge.
W. E. Wicatts, Roseburg	Tuesday, 15th	Mrs. W. W. Stevens.
Wabash, Wabash	Wednesday, 16th	A. O. Lockridge.
J. D. Conner, Jr., Wabash	Thursday, 17th	Mrs. W. W. Stevens.
Warren, West Lebanon	Friday, 18th	A. O. Lockridge.
W. F. Evans, Hendricks	Saturday, 19th	Mrs. W. W. Stevens.

JANUARY.

Delaware, Muncie	Monday, 11th	J. J. W. Billingsley, Jas. Riley.
J. R. Shoemaker, Daleville	Tuesday, 12th	J. J. W. Billingsley, Jas. Riley.
Adams, Geneva	Wednesday, 13th	Cal. Husselman.
G. H. Martz, Monroe	Thursday, 14th	J. J. W. Billingsley.
Steuben, Angola	Friday, 15th	Cal. Husselman.
F. B. Van Auken, Pleasant Lake	Saturday, 16th	J. J. W. Billingsley.
Hancock, Greenfield	Monday, 11th	E. H. Collins, D. B. Johnson.
D. H. Goblo, Greenfield	Tuesday, 12th	E. H. Collins, D. B. Johnson.
Randolph, Winchester	Wednesday, 13th	E. H. Collins, D. B. Johnson.
B. F. Wilmore, Winchester,	Thursday, 14th	E. H. Collins, D. B. Johnson.

FARMERS' INSTITUTES—Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Jay, Portland	Friday, 15th	E. H. Collins, D. B. Johnson.
S. K. Bell, New Mt. Pleasant	Saturday, 16th	E. H. Collins, D. B. Johnson.
Rush, Rushville	Monday, 18th	J. Q. A. Sieg, Cal. Hasselman.
W. L. Walker, Carthage	Tuesday, 19th	J. Q. A. Sieg, Cal. Hasselman.
Henry, Newcastle	Wednesday, 20th	J. Q. A. Sieg, Cal. Hasselman.
E. H. Peed, Newcastle	Thursday, 21st	J. Q. A. Sieg, Cal. Hasselman.
Putnam, Greencastle	Friday, 22d	J. Q. A. Sieg, Cal. Hasselman.
A. O. Lockridge, Greencastle	Saturday, 23d	J. Q. A. Sieg, Cal. Hasselman.
Posey, New Harmony	Monday, 11th	Mrs. V. C. Meredith, T. B. Terry.
Morris Pote, New Harmony	Tuesday, 12th	Mrs. V. C. Meredith, T. B. Terry.
Gibson, Patoka	Wednesday, 13th	Mrs. V. C. Meredith, T. B. Terry.
J. W. Johnson, Princeton	Thursday, 14th	Mrs. V. C. Meredith, T. B. Terry.
Knox, Bicknell	Friday, 15th	T. B. Terry, Jas. Riley.
R. M. Robinson, Wheatland	Saturday, 16th	T. B. Terry, Jas. Riley.
Jasper, Kusselaer	Monday, 18th	T. B. Terry, A. O. Lockridge.
L. Strong, Kusselaer	Tuesday, 19th	T. B. Terry, A. O. Lockridge.
Pulaski, Winamac	Wednesday, 20th	T. B. Terry, A. O. Lockridge.
Nathan Rawn, Winamac	Thursday, 21st	T. B. Terry, A. O. Lockridge.
Starke, Knox	Friday, 22d	T. B. Terry, A. O. Lockridge.
W. H. H. Coffin, Davis	Saturday, 23d	T. B. Terry, A. O. Lockridge.
Kosciusko, Warsaw	Monday, 18th	E. H. Collins, Mrs. W. W. Stevens.
Joel Hall, Clunette	Tuesday, 19th	E. H. Collins, Mrs. W. W. Stevens.
St. Joseph, South Bend	Wednesday, 20th	J. J. W. B. Jones, Mrs. Stevens.
W. O. Jackson, South Bend	Thursday, 21st	J. J. W. B. Jones, Mrs. Stevens.
Lagrange, Lagrange	Friday, 22d	J. J. W. B. Jones, Mrs. Stevens.
J. W. Mills, Lagrange	Saturday, 23d	J. J. W. B. Jones, Mrs. Stevens.
Fountain, Veederburg	Monday, 25th	H. F. McMahan, A. O. Lockridge.
A. Campbell, Hillsboro	Tuesday, 26th	H. F. McMahan, A. O. Lockridge.
Tippecanoe, Lafayette	Wednesday, 27th	H. F. McMahan, A. O. Lockridge.
G. L. Marshall, Lafayette	Thursday, 28th	H. F. McMahan, A. O. Lockridge.
White, Wolcott	Friday, 29th	H. F. McMahan, A. O. Lockridge.
E. H. Wolcott, Wolcott	Saturday, 30th	H. F. McMahan, A. O. Lockridge.
Wells, Bluffton	Monday, 25th	T. B. Terry, D. B. Johnson.
A. A. Waugh, Murray	Tuesday, 26th	T. B. Terry, D. B. Johnson.
Blackford, Hartford City	Wednesday, 27th	T. B. Terry, D. B. Johnson.
W. L. Ervin, Hartford City	Thursday, 28th	T. B. Terry, D. B. Johnson.
Howard, Kokomo	Friday, 29th	T. B. Terry, D. B. Johnson.
O. A. Somers, Kokomo	Saturday, 30th	T. B. Terry, D. B. Johnson.

FEBRUARY.

Lake, Crown Point	Monday, 1st	A. O. Lockridge, H. F. McMahan.
C. B. Benjamin, LeRoy	Tuesday, 2d	A. O. Lockridge, H. F. McMahan.
Fulton, Rochester	Wednesday, 3d	A. O. Lockridge, H. F. McMahan.
C. W. Montgomery, Rochester	Thursday, 4th	A. O. Lockridge, H. F. McMahan.
Newton, Goodland	Friday, 5th	A. O. Lockridge, H. F. McMahan.
E. E. Parsons, Morocco	Saturday, 6th	A. O. Lockridge, H. F. McMahan.
Morgan, Mooresville	Monday, 1st	T. B. Terry, A. Jones.
D. B. Johnson, Mooresville	Tuesday, 2d	T. B. Terry, A. Jones.
Johnson, Franklin	Wednesday, 3d	T. B. Terry, A. Jones.
J. W. LaGrange, Franklin	Thursday, 4th	T. B. Terry, A. Jones.
Fayette, Connorsville	Friday, 5th	T. B. Terry, A. Jones.
Jones Schell, Lyon's Station	Saturday, 6th	T. B. Terry, A. Jones.
Whitley, Columbia City	Monday, 8th	Cal. Hasselman, H. F. McMahan.
T. E. Adams, Cresco	Tuesday, 9th	Cal. Hasselman, H. F. McMahan.
Miami, Peru	Wednesday, 10th	Cal. Hasselman, H. F. McMahan.
Lafayette Plagg, Bunker Hill	Thursday, 11th	Cal. Hasselman, H. F. McMahan.
Tipton, Tipton	Friday, 12th	Cal. Hasselman, H. F. McMahan.
W. S. Kelley, Sharpsville	Saturday, 13th	Cal. Hasselman, H. F. McMahan.
Huntington, Huntington	Monday, 15th	A. Jones, H. S. K. Bartholomew.
J. M. Keeter, Roanoke	Tuesday, 16th	A. Jones, H. S. K. Bartholomew.

FARMERS' INSTITUTES--Continued.

PLACE OF MEETING AND CHAIRMAN OF INSTITUTE.	DATE.	ASSIGNED SPEAKERS.
Cass, Logansport.	Wednesday, 17th . .	{ D. B. Johnson.
Cott. Barnett, Logansport . .	Thursday, 18th . .	{ H. S. K. Bartholomew.
Clinton, Frankfort.	Friday, 19th	A. Jones, H. S. K. Bartholomew.
I. D. Reed, Moran	Saturday, 20th. . . .	A. Jones, H. S. K. Bartholomew.
Boone, Lebanon	Monday, 15th	J. L. Shawver, D. B. Johnson.
S. T. Stephenson, Lebanon . .	Tuesday, 16th	J. L. Shawver, D. B. Johnson.
Marion, Southport.	Wednesday, 17th . .	J. L. Shawver, A. Jones.
Chas. Richards, Howlands. . .	Thursday, 18th . . .	J. L. Shawver, A. Jones.
Madison, Anderson	Friday, 19th	J. L. Shawver, D. B. Johnson.
J. L. Thomas, Penileton. . . .	Saturday, 20th. . . .	J. L. Shawver, D. B. Johnson.
Laporte, Laporte.	Monday, 22d.	J. L. Shawver, A. Jones.
W. A. Banks, Laporte	Tuesday, 23d.	J. L. Shawver, A. Jones.
Porter, Valparaiso.	Wednesday, 24th . .	J. L. Shawver, A. Jones.
E. S. Merrifield, Boone Grove .	Thursday, 25th . . .	J. L. Shawver, A. Jones.
Marshall, Plymouth	{ Thursday, 25th . . }	Prof. W. C. Latta, A. Jones, J. L. Shawver.
J. A. Yockey, Plymouth. . . .	{ Friday, 26th . . . }	
	{ Saturday, 27th . . }	

ADDITIONAL INSTITUTES HELD UNDER STATE AUSPICES

COUNTY.	PLACE OF MEETING.	DATE.	SPEAKERS ASSIGNED.
Lawrence.	Mitchell.	February 12-13. . .	{ E. M. C. Hobbs.
Warrick	Boonville	February 13	{ Prof. J. Troop.
Grant.	Marion.	February 17	{ Prof. W. C. Latta.
Clark	New Washington . .	February 19-20. . .	{ Jas. Riley.
Owen	Patrickburg	February 23-24. . .	{ H. L. Nowlin.
Benton	Boswell	February 24-25. . .	{ J. B. Burris.
Jennings	North Vernon . . .	February 27	{ Profs. Huston & Bit-
Randolph.	Farmland	March 5	{ ting, Cal. Husselm'n.
Sullivan	Farmersburg	March 5-6	{ Jas. Riley.
Jefferson	Stony Point	March 9-10.	{ Prof. C. S. Plumb.
Carroll	Delphi.	March 12-13	{ Prof. J. Troop.
Jackson.	Crothersville	April 3.	{ Prof. H. A. Huston.
			{ Profs. Bitting & Hus-
			{ ton, Cal. Husselm'n.

The accompanying table gives the average attendance at the several sessions of each institute as reported by the secretaries and institute workers who were requested to secure as far as possible an actual count at each session. In all cases where reports differed, their average is taken.

TABLE SHOWING ATTENDANCE AT FARMERS' INSTITUTES.

COUNTY.	Number Sessions Held.	Average Attendance.	COUNTY.	Number Sessions Held.	Average Attendance.
Adams	5	38	Marion	5	184
Allen	5	175	Marshall	8	637
Bartholomew	5	405	Martin	5	105
*Benton	9	134	Miami	4	155
Blackford	5	140	Monroe	5	145
Boone	5	360	Montgomery	5	245
Brown	5	45	Morgan	5	264
Carroll	8	59	Newton	4	75
Cass	4	147	Noble	4	387
*Clark	10	74	Ohio	4	143
Clay	5	125	Orange	5	125
Clinton	5	285	*Owen	9	76
Crawford	5	55	Parke	4	193
Daviess	4	41	Perry	6	187
Dearborn	5	203	Pike	5	125
Decatur	5	195	Porter	5	134
Dekalb	6	370	Posey	6	334
Delaware	4	219	Pulaski	4	95
Dubois	5	114	Putnam	5	217
Elkhart	5	437	Randolph	7	215
Fayette	5	211	Ripley	5	79
Floyd	5	136	Rush	5	239
Fountain	5	76	St. Joseph	5	960
Franklin	5	235	Scott	5	76
Fulton	5	325	Shelby	5	310
Gibson	5	240	Spencer	5	172
*Grant	10	80	Starke	5	68
Green	5	80	Steuben	5	475
Hamilton	5	588	Sullivan	7	126
Hancock	5	395	Switzerland	5	240
Harrison	5	210	Tippecanoe	5	460
Hendricks	5	316	Tipton	5	548
Henry	5	420	Union	4	404
Howard	5	238	Vanderburgh	6	203
Huntington	4	285	Vermillion	4	256
*Jackson	8	104	Vigo	4	119
Jasper	4	64	Wabash	5	359
Jay	5	217	Warren	5	153
Jefferson	8	130	Warrick	6	146
*Jennings	9	133	Washington	5	276
Johnson	5	133	Wayne	5	376
Knox	5	330	Wells	5	365
Kosciusko	5	470	White	5	142
Lagrange	5	534	Whitley	5	364
Lake	5	123			
Laporte	6	167			
*Lawrence	10	99	General average		232
Madison	5	436	General average, '95-6		274
			General average, '94-5		118

* Two meetings.

The table shows a falling off in the general average. There doubtless was a slight decrease in attendance for reasons given above, but it is believed that the decrease in the actual attendance is less than the table shows. Last year for the first the assigned speakers were requested to report the attendance as a means of checking errors that might be made by the secretaries. On comparing reports it is found that

the speakers' reports show, generally, a smaller attendance than the secretaries' reports. It is probably true, therefore, that the secretaries' reports for previous years were slightly in excess of the actual attendance. An earnest effort will be made to insure the greatest possible accuracy in reporting the attendance hereafter.

OFFICIAL EXTRACTS FROM INSTITUTE REPORTS.

The accompanying extracts from the official reports of the secretaries in the several counties will serve to show the conditions under which the meetings were held and the degree of success attained.

Adams. The degree of interest was excellent. All said it was one of the most interesting institutes ever attended. Although the attendance was small the interest was excellent from the start to finish.

Allen. We were rather late with programs and posters so that the attendance was rather less than we expected. The date was earlier than desired and we wish to try February next season. The weather was very unfavorable; snow and sleet kept the friends from a distance at home.

Bartholomew. Our attendance was almost double what it was last year and a great deal more interest was manifested. Our display of farm products was equal to the display made at our county fairs. Our hall holds some six hundred people and at some of the sessions probably one hundred or more could not get in.

Benton. First meeting at Fowler. Institute was held just at the wind-up of the corn husking which kept many away. Second meeting at Boswell. The workers all gave entire satisfaction. Have heard nothing but words of praise for them. The interest was fair throughout, but was better at the last than at first. The work has been very highly spoken of here and another meeting was decided upon for next year. The townspeople came to our aid with music and helped us nobly.

Blackford. The institute was very well attended considering the very cold weather which was the coldest we have had for several winters. The interest manifested by those present was marked, especially in the remarks by T. B. Terry on wheat raising and some points in tillage. It will pay every farmer in the county to listen to Mr Terry on these points. Mr. D. B. Johnson's talks were well received and very helpful.

Boone. If we are capable of judging, we think this the most successful institute ever held in the county when measured by the interest taken by those present. Timidity took its flight from the audience and questions were propounded thick and fast and they were satisfactorily answered. Idle moments were consumed by answers to the question box. Muddy roads, long distance and an interesting criminal case in court kept many farmers away from the institute.

Brown. The farmers freely took part in discussion and seemed to be well pleased with the Institute. I think the Institute on the whole was more of a success than any former one.

Carroll. First meeting at Flora. Interest about as usual as suggested by the attendance. I believe the success is greater in some parts. Bad weather second day, which kept a large number away. Second meeting at Delphi. The small

crowds were much interested. The town seems the wrong point to hold an Institute. Prof. Bitting fully met the highest expectations in his work. Prof. Huston presented the sugar beet question in a way to arouse much interest in the subject. We found Mr. Husselman to be at home in Institute work. I feel satisfied that he would do well to be sent to our Institute next year.

Cass. While the attendance was not large, deep interest was manifested. Mr. J. H. Rohrer, of Logansport, gave an excellent address on the best way to dispose of the products of the farm. Johnson, excellent; Bartholomew, only fair.

Clark. First meeting at Charlestown. The degree of interest poor. The weather was fine and roads good. Nothing apparent to prevent a large attendance. Much interest was evinced by the ladies of Charlestown, as several were present. [Charlestown has not thus far manifested much interest in Institute work.—SUPT.] Second meeting at New Washington. The interest and attendance were good and above an average for Clark County. Interest increased the second day and there would have been an overflow attendance had the weather not been stormy. Lunch was served on both days in the hall. This (the lunch) is a move in the right direction, as it saves much time in taking refreshments.

Clay. Not the general interest taken that ought to be. We had rain the first day, which was against the meeting. Protracted meeting in town at the time.

Clinton. Interest was good throughout. Bad weather the last day, but the attendance was good. The Institute was a marked success. We feel the need of more local work and larger funds to make our efforts more successful.

Crawford. The interest was very good though the attendance was small, but this county is not as well adapted to farming as most of the neighboring counties. The older members of the Institute all agreed in saying that it was one of the best Institutes we ever had.

Daviess. The people were very lukewarm on account of the repeated failures of crops, the ravages of cholera and chinch bugs. With the exception of a few, there seemed to be no interest taken by the farmers. Several home speakers who promised to read papers failed to appear. Mr. Jas. Riley seemed to interest the Institute in his talk on the management of swine, though the people are much discouraged as they have been great sufferers from hog cholera. Mr. J. C. Stevens, on cultivation of corn and corn fodder, elicited a general discussion.

Dearborn. The Institute was highly pleased with both of the assigned speakers—J. C. Stevens and S. H. Todd. I heard no criticism of either. Everything considered, this was a very successful Institute. It was held in a country village (Bright) off the railroad and in a part of the county that had previously taken no part in Institute work. It was very rainy the second day, which kept a good many from attending. At the evening session the house would not hold the crowd.

Decatur. Inclement weather began with our Institute. Our chairman, who resides near the place of meeting, ran a free hotel and livery stable during the Institute, which, of course, was well patronized. Much credit is due him for the most excellent Institute. The people of the neighborhood hospitably entertained all who came from a distance. Great interest was taken; not a minute was lost. The assigned speakers—Riley and Husselman—will be gladly received again.

Dekalb. The number in attendance and the fact that we had perfect order and attention, will vouch for the success of the Institute. Interest was intense, and if the road's had not been very rough and the weather very cold, no place could have been found large enough to hold the people. The house was well filled as it was. [The chairman is entitled to much credit for thoroughly advertising the meeting.—SUPT.]

Delaware. The first day was very disagreeable in the morning. Monday and Tuesday are bad days for Institutes in this county. There seems to be lack of interest. We must have some wide-awake workers from the outside to create an interest.

Dubois. Interest good. Would have had a large crowd the second day, but it was rainy and very disagreeable to be out. Messrs. T. E. Bowles and E. M. C. Hobbs were both very good speakers, and our people were well pleased. Everybody said, "Be sure and get them again next year."

Elkhart. First forenoon, weather inclement. Interest of farmers in attendance, excellent. Kellogg and Todd could not be better. Local workers presented excellent papers.

Fayette. A larger attendance and more general interest was shown than ever before, although the first day was unfavorable on account of rain. T. B. Terry and Aaron Jones were bristling with strong points all the time and had no weak ones. They gave as good, if not better, satisfaction than any others ever sent here.

Floyd. The work of Messrs Kellogg and J. H. Brigham was very fine and of interest to those in attendance. E. M. C. Hobbs read a very fine paper.

Fountain. The interest during the Institute was very good. The small attendance was caused by the extremely cold weather, the temperature being from ten to twenty degrees below zero. Both Mr. McMahan and Mr. Lockridge gave good satisfaction. Their talks were well received and highly appreciated. Mr. Albert Burnside gave a very good paper on harvesting and utilizing the corn crop.

Franklin. We had the best Institute ever held in the county. I sent programs to all the teachers in the county and had them distribute same, so that almost every family had an opportunity of reading one. The assigned speakers (Todd and E. E. Elliott) were strong in all points and gave good satisfaction.

Fulton. Interest good from start to finish. Farmers from most distant parts of the county came early and stayed late. No time was lost. As soon as a subject was presented, animated discussions followed until the chairman called a halt. I think we can truly say the Institute was a success, the town as well as the country people enjoying each session. Mr. McMahan is simply grand in enthusing farmers and making them proud of their calling. Send him into all parts of the State that young men may be benefited by his example and stay on the farm. [The good success of this meeting is largely due to the excellent preliminary work done by the chairman and his coworkers.—SUPT.]

Gibson. The interest taken from the start until the close could not have been better. Although it rained all the first day it was one of the best institutes ever held, and all seemed to be satisfied. Mr. Cal. Husselman, of Auburn, is one of the best institute workers we ever had. Mr. J. Q. A. Sieg, of Corydon, is all right

and O. K. Messrs. J. B. Elliott and J. H. Gwaltney had excellent papers and were a great help to the Institute.

Grant. The interest throughout was good. Success good, but weather bad. Hall too small the second day. Some desire a three-day Institute next year before time of short days and bad weather.

Greene. There was a deep, earnest degree of interest manifested at each session. It was a representative body of farmers, anxious to receive and give information. I trust it will be a pardonable pride on the part of the chairman and myself if I say it was one of the best meetings we ever held. We have been unfortunate in having the Institutes conflict with the Circuit Court. This year Circuit and Commissioners' Courts were in session. Mr. G. C. Leaming seemed embarrassed and not so free in discussion as some others, but he impressed all with his thoroughly practical and business-like way of handling his subjects. Mr. McMahan possesses many strong points and few weak ones. We place him in the front rank—one who is determined to surmount all obstacles and achieve success in his chosen profession of farming.

Hamilton. I think the interest taken in the Institute was good. Everybody appeared to be alive on the several subjects that come up for discussion. Several times the chairman had to remind the audience, to the regret of many, that the time for discussion had expired. We consider Mr. O. F. Lane one of the best institute workers we ever had. Mr. D. B. Johnson is an able worker and gave us good practical experience.

Hancock. A remarkable degree of interest was manifested throughout. All the sessions were held according to program. It was the most successful Institute the county has ever held. The assigned speakers, Collins and Johnson, gave good satisfaction.

Harrison. The Institute was a success throughout despite constant rain on Monday and the disagreeable weather on Tuesday. The interest in farmers' institutes is growing. The chairman and secretary were reelected for the ensuing year. Mr. Kellogg gave entire satisfaction. Mr. Brigham did good work and gave satisfaction to our people. The local workers, of which there were several, rendered good service. [The excellent preliminary work of the local officers had much to do with the success of the meeting.—SUPT.]

Hendricks. We never had so attentive and interesting an Institute before. The hall was too small to accommodate the crowd at the third and fifth sessions. Mrs. Meredith as an instructor for schools and scholars could not be excelled. Mr. D. B. Johnson made some very practical points and was greatly appreciated. Mr. O. F. Lane was also well received. The speakers did not waste precious time in giving anecdotes, but every moment was used in earnest work. [The local preparations for this Institute were very complete.—SUPT.]

Henry. This was the best Institute ever held in Henry County. Will need a new court house to hold the people. Assigned speakers gave entire satisfaction. [Excellent preliminary work for this meeting had been done by the local officers.—SUPT.]

Howard. Good attendance of the most intelligent farmers, all ready and anxious to take part in the general discussions. We feel this is the most profitable

session we have had. Mr. Terry is one of the most satisfactory speakers we have had with us—sincere, earnest, practical and in close touch with the audience. Mr. Johnson was well received. He gave us very good lectures. Too much can not be said in praise of Professor Bitting's short talk. We regret he could not have given us more time.

Huntington. Our hall was too small the second day. Quite a number could not get into the room. The city folks got interested the second day and they now promise a hall next year that will seat 900 and it will be filled. By holding meetings in various parts of the county the interest has spread and we expect to double the attendance next year. Messrs. Bartholomew and Jones gave excellent satisfaction. Both would be greeted with larger audiences another year. Mr. Geo. Stevens, a home worker, read a most valuable paper on "How can the boy use his education on the farm." [Excellent local work is being done in this county.—SUPT.]

Jackson. First meeting at Brownstown. The more institutes we have the more enthusiasm is shown and the more farmers participate in the discussions. We have no words to convey to you our estimation of brother Milton Trusler and all were well pleased and more than gratified with Mr. McMahan. Miss Ruth Robertson, one of our local workers, rendered valuable service to the Institute. Second meeting at Crothersville. Our Institute was not so well attended as it would have been earlier in the season. [The chairman in writing of this meeting states that it was a great success in point of interest and intelligent discussion of the topics presented.—SUPT.]

Jasper. Those that attended were well pleased. With the personal efforts made we feel that the attendance should have been better. Assigned speakers (Messrs. Terry and Lockridge) gave perfect satisfaction. We could ask for no better. The only trouble we have is in getting the farmers out.

Jay. Institute was of great interest to the farmers and they voted to have a midsummer meeting. Mr. G. H. Martz of Adams County gave an excellent talk on the value of farmers' Institutes. E. M. C. Hobbs' work was excellent and well received. D. B. Johnson's topic—Dairy Farming—awakened a great interest.

Jefferson. First meeting at Canaan. Institute was held in a new neighborhood and our audience was made up principally of persons who never attended one before. One man declared he would be willing to go to the remote districts of the county to attend them hereafter. A few still stay at home and declare the whole thing a political scheme. We would like to have the assigned speakers sent us again. Second meeting at Stony Point. There was incessant rain the first day and evening and roads were so bad the second day that but few could attend from a distance. Interest good and people well pleased. Professors Troop and Huston were well received. Their subjects just suited the people of the locality.

Jennings. First meeting: The interest in the work in our county is on the increase; assigned speakers the best we ever had. Second meeting: Interest good and I believe the Institute might be called a success, although bad weather and sickness in some localities kept many away.

Johnson. Our Institute was not so well attended as the one last year. There was, however, no lack of interest, as we held a very profitable meeting. It was a noticeable fact that our most successful farmers were always in attendance.

Knox. Very successful. Interest was unexcelled. Messrs. Cal Husselman and J. Q. A. Sieg gave universal satisfaction. Mr. Husselmans' talks on drainage and dairying were especially practical.

Kosciusko. We have no room large enough to hold all the people that wish to come and hear. We believe there should be four or five Institutes held in different parts of the county and a round-up at Warsaw. [The plan recommended is now in vogue in a number of counties with excellent results.—SUPT.]

Lagrange. Interest excellent. Success good but our attendance was unusually small for the reason that the blizzard of the 22d set in and our people could not come. Besides, there was a great amount of sickness in the county at the time. Mr. J. J. W. Billingsley is a good man full of good sense. Coming from the city he does not hit the average small farmer. Mrs. W. W. Stevens, good, pleasant, practical, always liked and leaves the audience wanting to hear her again.

Lake. Interest on the increase. Mr. Lockridge and Mr. McMahan were both very satisfactory.

Laporte. The weather during the Institute was far from good, the country roads being almost impassable. We had much to contend with by having the Institute on a holiday, February 22, there being so much to take the attention of the people from the Institute. Although our attendance was small the Institute was a success and there was an unusual amount of interest. Both J. L. Shawver and Aaron Jones were very strong and gave excellent satisfaction, showing no weak points.

Lawrence. First meeting at Bedford. The greatest interest I have ever noted in our Institute. Conditions were unfavorable. Court was in session, deterring many from attending who would otherwise have been present. Mr. Milton Trusler is a very enthusiastic speaker, his strong point being the creating of enthusiasm. Second meeting at Mitchell. Roads very bad, but those in attendance were very much in earnest in search of knowledge to benefit them on the farm.

Madison. The interest was remarkably well maintained all the time; many of the audience took part in the discussions—our women as well as the men—and our young men were out in large numbers and took part in the discussions. The second day was rainy yet many farmers and their wives were there. Every township in the county was represented on the program. [The excellent interest and large attendance characteristic of Madison County are doubtless in a large measure due to the active efforts of the local officers and the good work of the county horticultural society.—SUPT.]

Marion. The church at Broad Ripple in which the Institute was held was well filled except at the first session. A very marked degree of interest was manifested. All were well pleased and the Institute was a grand success. Mr. J. L. Shawver, of Ohio, a very excellent worker, gave the best of satisfaction throughout. Mr. Aaron Jones did us good service and was well received. He gave us some very excellent talks. Mr. E. H. Collins, of Hamilton County, also rendered excellent service.

Marshall. During all the Institute there was great interest manifested. Although the weather was very inclement the general average attendance was 627. This was the first time that we have attempted a 3-day session. [This was the

closing Institute of the series and was admirably arranged for by the local workers. Several papers by local workers were excellent.—Supt.]

Martin. Our Institute was the best we ever had. The farmers were there on time, anxious to hear and willing to take part in the discussions. They were sorry when it was over, and decided to hold another in March at our own expense. All who attended last year, and many others, were present at this session. Mr. E. M. C. Hobbs interested all in his talks on different subjects. If he were sent into several counties of the State much good would be accomplished. Mr. T. E. Bowles did good work and gave much information. Coming from the gas belt where they have good roads his mode of farming was too high for Martin County, but he was liked by all.

Miami. Interest seems to be growing. Conditions this year rather more favorable than heretofore. Messrs. Husselman and McMahan were well received and handle their subjects ably and satisfactorily. [This county suffered from unfortunate local management some years since from which it has not fully recovered. Conditions improving, however.—Supt.]

Monroe. Every one I talked with—and there was quite a number—thought it was the best Institute ever held here. The farmers attended better and took greater interest than ever before. We have had better assigned speakers, but never so much interest among our farmers.

Montgomery. There was a greater degree of interest manifested at this Institute than ever before and the attendance was good throughout. Especial pains were taken to thoroughly advertise the meeting. I do not think there was an intelligent farmer in the county who did not know of the meeting. [Much credit is due to the Secretary for thoroughly advertising the meeting.—Supt.]

Morgan. Our 1897 Institute was the best we have ever held in the county. About two-thirds of the townships were represented. The best of feeling and perfect harmony prevailed; the interest has increased from year to year until the people are generally alive to the value of farmers' Institutes. [The success of the Institute was doubtless largely due to the excellent preliminary work of the Chairman.—Supt.]

Newton. The interest by those present was excellent. Every one spoke of the Institute as a permanent thing. Messrs. Lockridge and McMahan both gave good satisfaction. Every one spoke of them as giving very practical talks and, as far as we know, their work was well received throughout.

Noble. Interest good. Weather mild and fine and roads fairly good; a little early in the season for the farmers; shredding corn yet in progress. J. N. Babcock an excellent worker, but takes too much valuable time in telling anecdotes. S. H. Todd a good talker, a practical man and gave practical instruction. R. M. Kellogg much in earnest, thoroughly scientific and a splendid institute worker.

Ohio. The speakers failed to arrive until noon of the first day. The morning session was therefore abandoned. The second day it rained all day or the attendance would have been much larger. Interest was good and the Institute might be called a pronounced success considering the rainy weather. W. F. Brown, of Ohio, gave several interesting and comprehensive talks and took an active part in

the subjects presented by others. R. M. Kellogg gave several good talks from a scientific standpoint, which were appreciated.

Orange. The interest was in every way satisfactory and our farmers are coming to recognize the benefits accruing from the Institutes.

Owen. First meeting at Spencer. The attendance was small, but those present were representative farmers and progressive, influential citizens. But very few young men attended. The interest and enthusiasm of those present were good enough, but the small attendance was calculated to discourage the institute enthusiast. [The death of the chairman a short time previous is doubtless the reason the local arrangements were not as perfect as they should have been.—SUPR.] Second meeting at Patrickburg. This point is twelve miles from the railroad and the roads were bad. Much interest was manifested. The second day more men of the community were ready to participate in the discussions, and all listened attentively. I am sure good work was done, which will be felt in future institutes. Several workers from Clay County assisted at this meeting.

Parke. I never saw an assembly more orderly, attentive and appreciative. Local workers, including two lady teachers, rendered valuable service on the program. J. J. W. Billingsley and T. E. Bowles were both highly appreciated as efficient workers. We were highly entertained and I think much good will result from their talks.

Perry. The Institute was a success. More in attendance than heretofore. General participation by farmers in attendance. The local talent was exceptionally good. The interest surpassed all previous Institutes. Mr. Sieg's strong point was his ability to entertain. Mr. Lockridge's strong points (papers) were "Beef Cattle" and "Continuous Growth."

Pike. Interest was good, but the attendance was not what it should have been. The Institute was well advertised, and our farmers have no good reason for their absence. The Institute was a complete success, except in attendance. Mr. Riley's paper on "Management of Swine" was what captured the Institute, and many of our farmers expressed the opinion that it was the best paper of the Institute. "How to Keep the Boys and Girls on the Farm," by Mr. J. C. Stevens and continued by James Riley, was immense. The Institute voted to ask the return in 1897 of both Mr. Riley and J. C. Stevens.

Porter. Those present were as much interested as any one ought to wish for, and all that I heard express themselves thought it a grand success, but the lack of numbers seemed to show a lack of interest. This was due to rough roads and cold weather. Mr. Aaron Jones was not with us long, but gave many ideas that were excellent. His suggestion to the farmers to organize was criticized by one or two. Mr. Shawver was well received, and the farmers who heard him were sorry they could not hear more.

Posey. A very great interest was taken by both country and townspeople, and the meeting was a pronounced success. Assigned help said to be as good as any in the State. Our work was so crowded that we did not have time enough in discussion. We should have a three-day session. Our attendance and interest increased each day. Mr. Huselman is a strong practical man and rendered able support on any and all subjects. Mr. Sieg was entertaining and strong, but not so

practical. His remarks were confined to matters of a moral nature, rather than to the practical investigations of the farm. The two make a strong combination.

Pulaski. Weather stormy. County seat took no interest. Mr. A. O. Lockridge's talks practical and good. Ed. Lariber created much interest in poultry raising. C. L. Bader made a good showing on feeding hogs.

Putnam. Our Institute was very satisfactory in point of interest taken by the farmers of the county. While the attendance was not what the excellent work presented would have justified, the interest taken was such as to give good assurance of future success under good management. I hear nothing but commendatory remarks about the work of the Institute. Our assigned speakers—Terry and Riley—gave abundant satisfaction.

Randolph. First meeting at Winchester. For some reason the attendance was not as large nor the interest as deep as at the other meetings. The weather was somewhat against us, and the disposition was to make the meeting a political one. We were unfortunate in securing musicians who seemed to think that political songs were proper for such occasions. D. B. Johnson and E. H. Collins gave excellent papers, both being plain and easily understood. Second meeting at Farmland. A deep interest was manifested, though circumstances were unfavorable, as the Institute was held the day following the late heavy rains and a number of washouts made it impossible for the farmers to get to town.

Ripley. While the attendance was not as large as we desired, there was much interest taken by those present. In course of time I think we will be able to work our county up to what it should be in the institute work. Our great drawback is that so many think it is a political organization; but we are teaching them differently. Brothers Todd and J. C. Stevens did excellent work. They were the right men in the right place.

Rush. The weather was favorable and there was quite an interest taken in the meeting. The various subjects on the program were well discussed by the audience. I thought it was the best Institute I ever attended. Both assigned speakers—Mr. Terry and Mrs. Meredith—pleased the people and gave us splendid satisfaction in every way. Their talks were practical and interesting.

St. Joseph. Our Institute is this year, as usual, in the foremost rank. The interest is of the best. We need more time to satisfy our people. Mrs. Stevens' paper, "The Factotum of the Farm," gave best satisfaction. Mr. Billingsley is a good institute worker. His voice is a little weak for a large room. [One secret of the large attendance in St. Joseph County is the cordial attitude and hearty support of the business men of South Bend.—SUPR.]

Scott. There was an unusual interest manifested the first day of the Institute, but owing to rain on the second day there were not so many out as expected, but we had a very interesting meeting and some good work was done. The work done by Messrs. Lane and Riley was very satisfactory.

Shelby. We had the best Institute, and more interest than ever before. It was made so principally by home talent, and much credit can be given to Messrs. Wilson and Conger. We think Shelby County has the best home talent of any county in the State.

Spencer. The Farmers' Institute seems to have sown seed in this county that is destined to be of great benefit. The interest is slowly but surely spreading. The speakers—A. O. Lockridge and J. Q. A. Sieg—were well liked. Both gentlemen have the power of making their points very plain and also of making the farmers feel that they are of their class.

Starke. While the interest was fair, it might have been better. The farmers around North Judson are principally foreigners and do not take much interest in Institutes. The weather was very unfavorable. Mr. Terry's remarks were very good. He speaks from practical knowledge as well as in a scientific way. Mr. A. O. Lockridge treats his subjects in a very practical manner, displaying a practical knowledge. He is business from start to finish.

Steuben. We never saw a large audience so attentive and eager to hear everything that was said. Questions by the spectators showed deep interest. The attendance far surpassed that of any previous meeting, and a resolution asking for a three day Institute next year is proof that the people did not tire of it. Mild weather and good roads were in our favor. The assigned speakers—Messrs. Billingsley and Husselman—were both excellent. [Much credit is due to the local officers for their thorough work in preparing for the meeting.—SUPT.]

Sullivan. First meeting at Sullivan. This was a very interesting meeting. Farmers are taking more interest each year. The weather was so nice, however, that many farmers stayed at home to husk corn. The Institute voted that you send us Mrs. Meredith and Cal Husselman next year. Mr. T. E. Bowles is a good worker. His talks were well worth hearing. Mr. E. M. C. Hobbs is a pleasant talker and he has a good command of his subjects. We were well pleased with both speakers. Second meeting at Farmersburg. Rains and other unfavorable circumstances prevented a full attendance. The talks showed practical knowledge on most of the topics and good interest was manifested.

Switzerland. The farmers present seemed to be very much interested in the work and the subjects under consideration. All who attended were well pleased with the proceedings and the president was highly commended for her ability in preparing the program and conducting the exercises. The assigned speakers—W. F. Brown and R. M. Kellogg—were entirely satisfactory. We believe their work will be a means of increasing the success of the Farmers' Institutes in this county.

Tippecanoe. Institute held during a blizzard. Hall very cold. Interest good. Discussions were taken up too much by old men, who tried to bring up out-of-date methods. House full at night session. Governor Mount, who gave a short talk at the evening session, is a drawing card. Music excellent. It was said to be one of the best Institutes held in the county. Mrs. Meredith's subjects were well chosen, in touch with, yet leading the audience. Mr. Lockridge's first talk lacked preparation, if anything could be said against it, but it was more than balanced by the second, "The Sunny Side of Farm Life," which was full of wit and pathos. Mr. McMahan read good papers, well in touch with his hearers. [The hearty cooperation of the business men of Lafayette contributed greatly to the success of the meeting.—SUPT.]

Tipton. Good attendance and the degree of interest has never been equaled in our State. The interest is growing each year. The assigned speakers—Messrs. Husselman and McMahan—were satisfactory and we can recommend them.

Union. A three-day meeting. Weather disagreeable the first day; fair and warm the second day; cold and wet the third day. Great interest was manifested in every subject which was closely related to farm operations. The people were very much interested in Mr. Todd's talks. He is as strong a speaker as we have had in Union County. I believe he made a mistake in teaching that hogs may be inoculated by a mild form of hog cholera by eating decayed carcasses of hogs that had died of cholera. Mr. E. E. Elliott's talks, while meritorious, did not bring out discussions. I believe his work would be more popular if he made use of some personal experience. [The uniformly successful meetings in Union County are due largely to thorough preparation on the part of the local workers and active co-operation on the part of the farmers generally.—SUPT.]

Vanderburgh. The interest manifested was never better, if so good. People are waking up all over the county, and everybody said that the Institute was a grand success. The assigned speakers—Messrs. Riley and J. C. Stevens—were liked better, on the whole, than any two speakers heretofore. I have heard no words against them.

Vermillion. The Institute was a success. The farmers of Dana are taking more interest than ever in the Institute work. The work of Mr. A. O. Lockridge was practical and instructive throughout the meeting. He seemed thoroughly acquainted with his subjects. [Active co-operation of the business men of Dana is one reason for the uniformly good meetings at that point.—SUPT.]

Vigo. The audience was composed of the very best element of our farming community. The interest manifested in our Institute is sufficient to warrant the assertion that the Farmers' Institute is here to stay. The officers were new in the work this year, else there might have been a better attendance. As they have been continued in the work they hope to make a better showing in 1897. Each talk by the assigned speakers—Messrs. Billingsley and Bowles—was the result of practical experience. The experience and ideas were clearly put in concise form, imparting the greatest amount of information in the fewest possible words.

Wabash. Institute was a success from start to finish. A large and commodious circuit court room was crowded at all the sessions except on Wednesday evening, when there were three other entertainments in town. Mr. Lockridge was well received. Every one appeared to enjoy his short and incisive talks, especially his comments on hog cholera. Mrs. Stevens would make the Institute move, even if not so ably assisted as she was, and needs no comment.

Warren. The greatest drawback is the shape of the county, and the great distance some have to go. Many farmers of the northern part of the county have attended the Oxford meetings in Benton County, but could not go as far as West Lebanon. The assigned speakers—Mr. A. O. Lockridge and Mrs. W. W. Stevens—were as strong a team as we have yet had, which is saying a great deal for them.

Warrick. The Institute was held under rather unfavorable circumstances, the weather having suddenly changed from warm to cold. For this reason we had a small attendance. Those present got the full benefit of a good Institute. We felt

complimented by having two such workers as Messrs. Sieg and Lockridge with us. They did most excellent work. We would be glad to have such men with us next season.

Washington. There was a better attendance than ever before. Everybody repeatedly said we had an excellent Institute. The weather was not favorable the first day, but people came right along. The interest is now so good that the spread will be marked. Col. J. H. Brigham was complimented by many who heard him. Mr. R. M. Kellogg was a favorite among our fruit men. Local speakers rendered valuable assistance. [Excellent preparation was made for the Institute by the local officers. The Farmers' Club of Salem is no doubt a potent factor in developing conditions favorable to the Institute work in Washington County—SUPT.]

Wayne. The Institute was one of the most practical we ever held. So long as we are supplied with good, honest men from abroad we will succeed. Mr. S. H. Todd is one of the best workers we ever had. Mr. E. E. Elliott is very good, and gives promise of making one of the best workers. A local worker—Mr. Enos Warfle—gave a most excellent paper on "Agriculture in the Common Schools."

Wells. The attendance was very good considering the extremely cold weather, 22 to 24 degrees below zero each morning. Had the weather been good we could not have accommodated the crowd. The farmers take great interest in the Institute. Mr. Terry and Mr. Johnson are very much liked in their institute work; they are plain, practical, common sense speakers. We would be satisfied with either for next year.

White. Cold weather detracted somewhat, but the interest is growing, and a disposition is shown to profit by the work. All seemed pleased and anxious for the work to continue. Mr. McMahan and Mr. Lockridge handled their subjects most ably, and gave general satisfaction.

Whitley. Interest in the Institute work is rapidly increasing. Farmers are beginning to realize their benefits. Our halls are too small. Our home speakers take pride in their work, and prepare much better papers than formerly.

EXPENDITURES.

The following is a classified statement of disbursements of the Institute fund from November 1, 1896, to June 30, 1897, as taken from the Superintendent's books:

Bills of county institute chairmen	\$2,158 63
Traveling expenses of assigned speakers.	1,029 14
Traveling expenses of superintendent.	41 73
Per diem of assigned speakers	1,389 93
Stenographic and other clerical work	222 36
Supplies	3 50
Printing and stationery	60 35
Postage.	85 00
Telegrams, freight and express charges	5 91
Miscellaneous.	3 45
Total.	\$5,000 00

PUBLICATION OF INSTITUTE PAPERS.

For several years the State Board of Agriculture has courteously published in its Annual Report a number of papers by local Institute workers. This plan, having proved very satisfactory, is continued. The accompanying papers by local Institute workers have been sent in by Institute chairmen in the respective counties. They are published without abridgment or material change.

LINES OF WORK.

The lines of work that have been pretty thoroughly discussed at institutes during the past eight years include, among others, the care of the soil, manures and fertilizers, crops and cropping, the importance of live stock in husbanding the soil resources, the relative merits and profitableness of different classes of live stock, the importance of agriculture, the relation of agriculture to other industries and interests, highways, education and the home. These subjects should continue to receive thoughtful attention, but it seems desirable that emphasis in the future should be laid as well upon the following named subjects: Live stock husbandry as a means of increasing the profits of the farm, woman's work, how to lighten the labors and increase the comforts and cheer of the home, economy and profitableness of good roads, the most economical and efficient means of highway improvement and maintenance, the improvement of the country schools, agricultural education, diversity of farm industries as a means of reducing competition in the production of the staples, how best to refine the products sold from the farm, fruit culture, sheep husbandry, dairying, sugar beet culture, etc., in localities especially adapted to these industries; interdependence of agriculture, manufacturing and commerce; feasible lines of co-operation (a) among farmers, (b) between town and country, (c) between farmers, manufacturing and transportation companies; the real advantages of life in the country and how to improve them.

The local officers and institute workers should labor unremittingly to secure the assistance of the most highly successful farmers, stockmen, fruit growers, dairymen, etc., and the co-operation of the business and professional men of our towns and cities in the institute work. With such effective aid and co-operation the progress of the work will be increasingly rapid and the beneficial results correspondingly increased.

ACKNOWLEDGMENTS.

The agricultural and newspaper press have rendered very substantial service to the institute work during the past year. The local newspapers in the several counties have been especially helpful in publishing in full the proceedings of the meetings held. With a few exceptions the newspaper men have been notably generous and helpful in advertising the institutes when the matter has been intelligently brought to their attention. The citizens of the towns and cities continue to show unabated interest and render valuable assistance in the work. In the few cases of want of co-operation on the part of townspeople the fault has almost

invariably been with the local managers. The local institute officers have in the main worked faithfully and intelligently in preparing for and conducting the institutes in their respective counties. In many instances they have held one or more independent meetings as a means of diffusing more widely the benefits of the institute work. In a number of the counties several independent meetings are held each year, and the results are already apparent in the success of the annual meetings and the cordial attitude of the farmers in general to the work. The railroad companies have almost without exception rendered very material aid by granting special rates to institute workers. In granting such rates the railway companies have contributed several thousand dollars to the support of the institute work, and by so doing have enabled the managers to conduct the work on a more extensive scale than would otherwise have been possible. The cordial co-operation and efficient aid rendered are greatly appreciated by the general committee on institutes.

The undersigned acknowledges with genuine pleasure the many and substantial favors rendered to the institute work. It is his desire to so conduct the work in future as to promote the common good and thus merit the continued co-operation and support of all.

PURDUE UNIVERSITY,
LaFayette, Ind., June 30, 1897.

W. C. LATTA,
Superintendent Farmers' Institutes.

THE FARM.

MISTAKES ON THE FARM.

BY E C MERCER, ROCHESTER.

Read before the Fulton County Farmers' Institute.]

The great want of farmers is more information, and there ought to be no class of people more anxious to obtain information in relation to their business than the farmer. The practical farmer, whose livelihood depends on his calling, should make it the pinnacle of worldly ambition to excel in it. If he neglects his farm for almost everything else, he is generally a miser, both in interest and credit. Solomon, the wisest observer of men, tells us of his disgust at the sight of a slovenly farmer. "I went by the field of the slothful and lo, it was all grown over with thorns, and nettles covered the face thereof, and the stone wall was broken down." How many farmers are there to be found to-day who can plead "not guilty" in reference to some one or more of the following errors? Namely, allowing weeds, such as thistles, docks, etc., to grow along the highway? Allowing elders, burdocks and nettles to grow along fences, and Canada thistles, foxtail, pigweed, ragweed, etc., to grow among and sometimes eclipse crops? To pile manure against the side of the barn, until it rots and mires the cattle, instead of spreading it for crops? To admit the pigs to the door-yards to root up the grass and help themselves to swill at the kitchen door? To scatter implements, such as plows, harrows, mowers and binders, along the sides of the road or over the fields, exposed to all kinds of weather? To grow crops and neglect to care for and save them? Cornfields, with a dense undergrowth of weeds, and other crops with a dense overgrowth of the same? And last, but not least, the selling of all the by-products of the farm, *away* from the farm, and still expect to grow full crops? We must put some humus in the soil, if we would keep up its productiveness. We can not put a constant drain upon our land, if nothing be returned to the soil, without impoverishing it. And whilst this is true, yet there is one vice very few farmers take to—advice. As agriculture is the basis of all national prosperity, so livestock is the basis of all great agriculture. Nothing we can do produces better results on soil and yield than the application of manures, rotating our crops, and thorough tillage. And of all the waste upon the farm, perhaps there is none more apparent than that of manures, and none other of anything like the same extent that can be so easily prevented. There is an enormous waste of the by-products of the farm that could be made a source of profit, both to ourselves and land; especially is this true of straw. It should be utilized and converted into fertilizer by way of the stable, allowing stock to eat the straw

stacks down and then apply to the land each year; some, even after their stock have eaten them down, allow the residue to remain in the barnyard or field, as the case may be, and be lost by leakage and evaporation. Manure making and money making on the farm are almost synonymous terms. Industry, prudence and economy are essential to insure success in any business. We then, by the use of these same measures and the application of all the manure that can be made upon the farm, may increase the productiveness of the soil. From my own experience in the application of manures, any time of year, spreading from the wagon gives the best results, and spread as evenly as possible; more depends on this than would be supposed; if it is left in lumps or chunks some plants will get more than their share, while if it is evenly spread all plants will be benefited alike. There is absolutely nothing to be gained in unloading in the field in conical piles.

There is no economy like doing everything thoroughly, and for all practical purposes true science is a thorough knowledge of a man's own business. The farmer who knows how to make the most profit with the least amount of expense, and understands how to make the most out of his land without impoverishing it, but rather continually improving it, is truly scientific. Land well and evenly plowed is half worked; therefore, it is a mistake to plow land in a cut and cover sort of way. Culture in the production of crops is as essential as the cultivation of them. I wish to present the thought that cultivation is applied to the thing that grows, culture to that in which it grows. Now the cultivation of any crop will not repay the labor unless the soil be prepared by proper culture. In the same manner in speaking figuratively, we say the cultivation of any art or science, the cultivation of our tastes or inclinations, may be said to contribute to our skill or perfection of the thing itself. As the mind requires culture, previous to any particular exertion of its powers, so in the cultivation of crops. We must have productive power to support them. We can not hope to produce paying crops from sterile soil, no matter how thorough the cultivation. We must put the soil in such condition that it is able to supply plant food to the growing crops. The fertility of the soil is decided largely by its texture, amount of moisture contained, and temperature. Upon the texture depend the care with which it is plowed, and the readiness with which air, water and the roots of growing plants penetrate it, and without doubt this texture is much affected by good or poor plowing. While I do not think that cultivation adds anything to the soil, yet we know that by a thorough mixing of its particles we may conserve moisture and liberate fertility. We are governed to some extent by conditions, but we ought as farmers to feel the necessity of a better knowledge of different kinds of soil, their treatment, needs, etc. Then by consistent methods of planning so as to gain full use of the soil, and the development of skill in a business where every year ought to count for surer results. Instead of being most subject to change of all producers, the farmer should be the most careful of planners. The theoretical and practical should go hand in hand together. We must necessarily have correct theory or practice would be incomplete upon false theory, for practice makes perfect—practice alone. But a knowledge of principles is the true and solid

foundation of correct practice, and principles are vital in agriculture as in everything else. The wisest farmer can not know everything that would be useful in his calling; there must be some department in which his knowledge might be improved. What is more reasonable, then, than that he should consult and profit by the experience of others. As a means to this end I would suggest that every farmer ought to read one or more practical farm papers. Oh! that farmers would awaken to the thought that we ought to have more educated farmers, not an education that takes our boys from the farm, but that they might be able to follow the profession with pleasure and profit. Boys, don't leave the farm. The boy who leaves the farm field for the merchant's desk or the lawyer's or doctor's office, thinking to dignify or ennoble his toil, makes a sad mistake. He passes, by that step, from independence to vassalage. Would that young men might judge of the dignity of labor by its usefulness and manliness rather than by the superficial glosses it wears. In conclusion, to young farmers especially, let us be studious and inquisitive as well as laborious. Let us remember that for real independence farming is the best business in the world.

CO-OPERATIVE FARMING.

BY C. W. BEEKER, WEST LAFAYETTE.

[Read before the joint county Farmers' Institute of Clinton and Tippecanoe Counties.]

For the benefit of those who were not able to participate in the discussion of a paper on co-operative farming read at our last meeting it will be necessary for me to repeat some of the arguments set forth at that time. In substance, I there stated that the tendency of the day is more and more toward a common tendency; that very many of the large land owners, and not a few of the smaller ones, have ceased to farm their own lands, but have leased them to a second party, either for a cash consideration wherein the tenant does and is expected to take from the land everything he possibly can, or a grain or hay consideration which is fully as objectionable, because it does not permit or encourage the growing or feeding of live stock. We farmers seem to forget that our possessions are as enduring as eternity; that this old earth will continue to make an abiding place for the future generations to come. But be assured these rich valleys will soon refuse to nourish the people if we fail to exercise the common sense with which we are endowed. Therefore, since we are to hand down to our successors these possessions, it behooves us to leave them in the best possible condition. These facts induced me to adopt co-operative farming. I was aware that constant cropping led to impoverishment; that the old adage, "No cattle no dung, no dung no grain," is as true to-day as when penned 300 years ago. So I supplemented our rental contract, which called for a division of grain and forage, with the raising and feeding of swine and cattle. We purchased an outfit of brood sows, a male and some young

shoats, and started into business. The corn we fed them we jointly owned; they were assessed in the same ratio, and the money received by sales at various times was likewise divided. These existing conditions enabled us to hog down a goodly portion of the growing corn crop, thereby saving the gathering, besides putting back on the land much good fertilizer. In fact, we almost finished off quite a hundred head in this way. When the ripened corn was gathered we stored away a thousand bushels for future use in the business; the remainder was divided as per provisions in contract. We had the ups and downs attending the occupation, but did fairly well, and will continue the practice the coming year.

A few weeks ago I bought a small drove of mixed cattle and offered my man a share in them. He readily accepted. He being a man of limited means was not able to pay his share of the purchase money. I therefore furnished the entire amount and charged him with the interest on his share of the investment until such a time when he may have the money in hand or the cattle will be marketed. By this means we will be enabled to market our corn at home in the manufacture of both beef and pork, as we have a sufficient number of shoats to follow the cattle and take up the droppings therefrom. This branch of stock industry is my favorite, as it affords the least danger of loss by disease and furnishes the greatest amount of fertility. I would say that the husbandry of sheep would bring the most gratifying results. In fact the opportunities to put in practice this system are almost unlimited. I can think of no labor connected with farm life that can not in this way be made lighter or more profitable.

I have in mind the idea of a few neighbors owning and operating a threshing outfit. It's the most practical thing possible, not so much in the saving of money, although this would be no small consideration, as it will enable these individuals to perform the labor at the most opportune time and thereby handle the grain in the best possible condition. I know that last year several thousand bushels of grain was almost ruined in our neighborhood because we were almost compelled to thresh when too wet in order to get it out of the way and enable the machine to continue on the route laid out in the work before it.

Now if the outfit had been ours we could have covered it up when the grain became too wet to thresh and gone about our other duties until it had dried out sufficiently to make it safe for housing. Even when the weather is good it is often desirable to stop threshing for a spell to enable the men to go over the corn, cut the oats or put up the hay. Such an outfit would cost each but little, and would last for many years by being carefully housed and not having to undergo the usage attending the hauling over the rough roads from one place to another. To this could be added a corn sheller, a wood saw or corn shredder.

I would recommend a portable engine, as such a one would cost much less than a traction, and answer all purposes. The thresher should have all the best improvements and should be one of small capacity, as this will require less power to operate and the least number of men to perform the work, thereby enabling the interested parties to do the work with the labor connected with the farms. Again, coöperation in marketing is surely very practical. A greater quantity of grain will bring more per bushel than a small quantity; so these neighbors could take their

sheller and handle the corn from crib to rail with the least possible labor, and secure the highest price.

Small farmers of truck and fruit who chance to live too far from market to make it profitable to go each day with a small quantity of produce, could join common interests and alternately gather up each small quantity, making one good load and one trip, instead of several, thereby reducing greatly the cost of transportation.

REMARKS AS TO PROCESS.

As I said before, there is almost an unlimited number of opportunities that furnish a chance for a trial of the system, and I might add that while I think it will be reasonably profitable to coöperate in the management of large farms, the smaller farms, or those of eighty or 160 acres, seems to me the ideal ones from which to procure the best result, for the reason that on such a farm one is enabled to handle with ease enough live stock to consume every pound of grain or forage grown. It again occurs to me that when the father desires to retire from active service and give the boys a chance, he could do nothing better than coöperate with them. Now, in conclusion, I will say you may call this sentiment—I am delighted to know it is a sentiment, if only a right sentiment, as I believe it is, and I will repeat again that the system in vogue of tenantry does not bring landlord and tenant into a sympathetic union of interests, but tends to widen the already existing breach created by greed, jealousy and a want of common interest. It does not bring out the best qualities in our natures or tend to encourage intellectual or social advancement. If adopted it will put a premium upon mind rather than matter, upon brain rather than brawn. Education and moral worth will bring a premium in the thus created market which will thereby produce a wonderful stimulant to a higher order of farm life and living.

CO-OPERATIVE FARMING.

BY W. W. FRY, FRANKFORT.

[Read before the Joint Farmers' Institute of Clinton and Tippecanoe Counties.]

I feel unable to discuss this question or present my views, from the standpoint of a tenant farmer, as the necessity demands. The definition of the word "co-operate" is to work or act together. The definition of the word "co-operative" is promoting the same end. The end desired then, by both land owner and tenant, is the betterment of their financial conditions. I shall make the assertion that co-operative farming is best for both land owner and tenant where farms are sufficiently large to admit of it.

Being a stranger to the people, to the methods and manner of tenant farming in this locality, I can not speak knowingly of the success obtained by the methods practiced. While the per cent. of co-operative farming in the different localities

in which I have resided has been small the results obtained have been highly satisfactory to both landowner and tenant. Speaking in a general way, it is presumed that where men are engaged in business together, in order for one to be successful the other must sustain a loss. But there are exceptions to almost all rules, and in co-operative farming is one instance where the exception prevails, for the interests of both parties are identical. A large number of farms that are cultivated by tenant farmers are owned by men who have become too old and feeble to farm their lands, and an equally large per cent. of said farms are cultivated by young men with a limited experience in agriculture.

Then the old, retired farmer, with a thorough knowledge of the various methods of stock raising and agriculture, and being fully acquainted with the different kinds and quality of his soil, can impart to the young man the information which has taken a lifetime to accumulate. The young man is benefited by the knowledge imparted by the man of experience, and the aged man is benefited by the labor the young man is ready and willing to perform. But it is and will be an impossibility to engage in co-operative farming generally throughout the country, for the reason that a large number of farms are too small to admit of it. But on farms cultivated by tenant farmers containing 120 acres or more, co-operative farming should be encouraged and practiced. Some of you may wish to know what we term co-operative farming. The method practiced in Clinton County, in the vicinity in which I reside, is for the tenant to furnish all horses and farm implements required to do the work, pay all expenses of planting, cultivating, harvesting and marketing the various crops; take one-half interest in cattle, hogs, sheep and poultry; the land owner furnishing the land, making all necessary improvements, and taking one-half interest in all live stock just mentioned.

I beg your indulgence in order to refer to a farm of two hundred acres in my neighborhood, farmed on the coöperative plan just described. There is as much live stock kept on this farm as can be kept profitably, which requires an abundance of pasture land which is principally clover, at the same time a sufficient amount of grain and forage crops are raised for feeding purposes. All grain except wheat and a portion of the rye crop are fed on the farm, which brings a much higher price than the grain market affords at the present time.

With an abundance of clover and a liberal supply of manure made and applied, the fertility of this farm is increased every year.

This farm is owned by a widow lady. On the first day of March, each year, there is an invoice made of everything on the farm that is held in partnership. At the same time a strict account is kept of all sales off the farm, so that both parties know exactly what they are doing.

For the past six years, under the present management, this farm has made the owner eight per cent. interest on an investment of ten thousand dollars. I am convinced that there is a preponderance of evidence in favor of the coöperative plan. There are other farms in Clinton County operated on the coöperative plan with equally satisfactory results. There are a number of reasons why coöperative farming should be encouraged and practiced. It gives the land owner a voice in the various details of the farm, in the cultivation and marketing of crops, in the breeding,

management, feeding and marketing of live stock; also, full control of all improvements to be made on the farm. Compared with other systems of farming, such as grain or cash rent, the coöperative plan is much better, especially for the land owner, for the reason that the fertility of his land is increased. While under the cash rent system the tenant, generally speaking, is forced to continuous cultivation, thereby exhausting the soil. But the demands of the land owner must be met if it takes all of the grain the tenant has raised, possibly a horse or two and the last cow to pay the rent. Under the grain rent system things are a little more favorable for the tenant with a just demand on the part of the land owner, say two-fifths of all crops produced and a reasonable cash price for pasture land, he receives his share of just what his land produces for him.

Remember the assertion that I made in the beginning, that the coöperative plan was the best for both parties, by it they go hand in hand, profits and losses are shared equally. But there is one thing that must be secured and maintained by both parties, and that is the good will and full confidence of one in the other. Without this both will labor under adversities.

SUCCESSFUL *vs.* UNSUCCESSFUL FARMING.

BY MRS. HALLIE H. SMITH, ZION.

[Read before the Jefferson County Farmers' Institute.]

Success in farming, as well as in any other calling, is a relative term. There are various things to be taken into consideration in forming an estimate of a man's success in any calling, such as the natural ability of the man himself, his opportunities and environments.

A man may own a large tract of land, employ many hands, raise and sell a large amount of produce or stock, and to outward appearance be eminently successful. Yet if his products cost as much or more than they bring in the market, and he is toiling on year after year under an ever increasing burden of debt, he can hardly be called a successful business man.

On the other hand, a man may have but a few acres, which he carefully tills, raising large crops with but little expense for labor, gradually paying his debts and adding improvements from time to time, besides making a comfortable living for his family. Such a man, it is evident, is a more successful farmer than his neighbor with the larger farm.

Of all the obstacles to success in farming, aside from laziness, it seems to me the greatest is attempting too much.

A farmer raises some wheat, corn, oats, potatoes, and perhaps beans, and if he lives near a market town, various kinds of vegetables for market, besides fruits, large and small.

Some of these crops require to be planted about the same time, and in the hurry to get them in the ground is poorly prepared, and they are not planted as carefully as they should be to insure the best results. The same is true in regard to cultivation and harvesting.

Most farmers now know that the soil should be stirred as soon as possible after a rain, in order to pulverize the crust and prevent the evaporation of moisture; also, that the best possible time to kill weeds is as soon as the seeds have germinated. But, with so many conflicting duties, this is not done. A hard crust is formed, moisture rapidly evaporates, leaving the ground dryer than before, but the weeds grow right along. When at last cultivation is begun it requires perhaps twice as long as it would have done at the proper time, besides a permanent injury to the crop. Then how unsatisfactory it is to be always rushed, and yet to know that nothing is attended to quite as well as it should be.

Many farmers and their families work from four or five o'clock in the morning till eight or nine at night almost the year around. True, there are a few days of recreation, but in most of these the thought of duties left undone detract in some degree from their pleasure.

Now it seems to me that most farmers could by careful study decide what is best adapted to their soil and market facilities, and make a specialty of a few crops, using home fertilizers with a clover rotation, and raising really first-class crops that will pay a profit.

Keeping account of the cost of production and amount of sales would enable one to determine the profits.

Another great leak on the farm, caused in part by having too much to do and in part by carelessness, is the exposure of farm implements to the weather. Plows, harrows, reapers, and even threshing machines, are left where last used, for months at a time, the exposure injuring them far more than the use they have had. I wonder what the men would think if our sewing and washing machines, etc., were left exposed in the yard for weeks at a time. Wouldn't they begin to preach economy?

Stock is also kept at a loss. Cattle and sheep are left exposed to the pitiless storms of winter, with no shelter night or day; hogs are kept confined in filthy pens, horses overloaded, overworked and neglected by those whose duty it is to see that they are properly cared for, until they are prematurely old and worn out.

Stock kept under such conditions can not be profitable, besides the cruelty of it.

Mr. Terry very forcibly remarks in his book, "If I could not have my stock comfortable on Sunday and attend church, I should know where my duty was. A man can serve God in his barn."

I am of the opinion that a man who does not habitually treat his stock kindly, and do all in his power to make them comfortable, does *not* serve God, however much he may attend church.

Farm products are so low now that it does look discouraging for a young man to start in life incumbered by debt, as most of them must, if they buy a farm. This is a greater reason why only so much should be undertaken as he can reasonably hope to do in the very best manner, while caring properly for implements

and stock. There is always more to do than we anticipate, and hindrances that we can not foresee.

Another thing that is absolutely essential is the constant personal oversight of the farmer himself. Our helpers are apt to gauge their efforts by that of master or mistress. If their employers are rapid, thorough workers, looking carefully after every detail of cultivation, harvesting and care of stock, so as to avoid waste and loss of all kind, the help will be stimulated by his example to do his best. But if for any reason, either of business or pleasure, the owner is absent very much, or careless when present, work will drag and things go to waste in an alarming manner.

Poor Richard's maxim, "He who by the plow would thrive, himself must either hold or drive," is emphatically true.

Another thing that is essential in buying a farm is to devote every dollar possible to paying off the debts. Men frequently take in considerable sums, and instead of paying debts and lessening interest, invest the money in enlarging their business, buying stock or something which they *hope* will bring in large returns, only to be disappointed. Sometimes, indeed, they invest in gold watches or other luxuries, which it would be safe to do without until a home was secured.

A neighbor once told me he had cleared \$200 off of thirteen hundred tomato plants by staking them, trimming off the laterals and giving extra attention. He remarked: "Next year I will plant three thousand." I advised him to plant only the same number and give them the same care, telling him that he could not properly attend to so many in connection with his other work. I added: "You will probably not make as much off of three thousand as you have off of thirteen hundred." He was not convinced, planted the larger number, and in the fall confessed that he had not made as much.

Another farmer owned a fine farm and had the money for the last payment, but concluded, against the advice of his friends, to build and furnish a nice house instead of making the last payment. The price of the crops he was raising depreciated, his crops failed several seasons, and he finally lost his beautiful home; his wife died of hard work and discouragement, and in his old age he is forced to rent a small place wherever he can.

It is easier to do without luxuries in early life than necessities in old age.

I believe that the best thing a young couple can do is to go into a building association. It is so hard to save small sums of money, and the weekly payment compels one to do so. And now, right here, I want to say a few words from a woman's standpoint. I hope all the men have read Mr. Terry's "The Wife's Share." If not, please do so. When a man and woman marry they enter into partnership. When two men enter into partnership they fully understand that they are under obligation to consult each other about all business matters and share the profits. Do men always treat their wives as if they were a business partner?

A lady, a professional nurse, who goes into a great many homes, said to me: "It is a surprise how few women have any money. If they want any little thing or to give a nickle for any purpose they must ask their husbands." Then she remarked that she was thankful she was not dependent on a man. Another thing

in which many husbands forget that their wives are their partners is in going security. A neighbor or friend needs money, and for fear of offending him he places his name on his paper. Time passes and he has it to pay. Who is benefited? Frequently not even the man for whom he went security.

Has a man a right to deprive his wife and children of the comforts of life to give their money to a friend? If he don't believe that his wife helps to make the living let him try to hire some one to do the work she does and he will surely be convinced.

I have known some sad cases of security debts. One young couple worked almost day and night to pay for a home, the heaviest burden falling upon the wife, who worked out doors and in, at the same time caring for little children. They worked cheerfully and were succeeding well, but the husband had, from time to time, unknown to his wife, been going security for a worthless brother, and at last had a large sum to pay. He and his wife were almost crazed. He appealed to a friend for advice and assistance. The friend said: "I am sorry for your wife. She has worked hard, and denied herself almost everything to get a home and educate her children. And now all is lost. I can't feel sorry for you, for you knew your brother, and knew you were not helping him, and you had no right to give away what belonged to your wife and children.

Nothing was left, however, but to begin again at the beginning and toil on, the wife broken in health and spirits, with but little hope of ever getting a home of their own.

Another case I knew where the wife for years wanted an organ for her girls, and other things to beautify the home.

They seemed to be prosperous, and it was a matter of surprise that they could not afford these things. But it was explained when it became known, years after, that they had just finished paying a security debt of \$1,600.

Oh, the heart aches those security debts cause!

Men who claim to be the soul of honor, and who would scorn the idea of cheating a business partner out of a cent, or of using their joint capital without his consent and approval, will, against the wishes and entreaties of his wife, place his name on the note of a friend, or even an acquaintance, with the possibility, and often the probability, of losing all.

As a rule, no one will sacrifice more for a man than his wife, and it is unjust and unfair that he should risk their hard earnings to pay another man's debts.

Another point is that when some one else is responsible for a man's debts, he does not always try as hard as he might to cancel his obligations.

Security can be avoided, and I would advise young couples to have it understood from the beginning, as we did, that there shall be no security debts.

A man can have it understood that he will neither ask nor go security.

He would have no hesitancy in refusing to place his name on a man's paper without the consent of his business partner, that is, to use their joint capital, then why should he be ashamed to refuse to do so without the consent of his wife, who is really his business partner; and on a farm really earns a considerable part of the income.

In order to make a success of farming, husband and wife should consult each other and work together.

If in debt, deny themselves needless luxuries, and put forth every effort to get out of debt, *first of all*.

Don't let the wife do all the denying, though. Money that is spent for tobacco, cigars or beer, would furnish many comforts for the home.

Go slow on improvements till the farm is your own, or you may be improving for some one else.

It is a great satisfaction, as we know from experience, to be able to say after years of hard work and self-denial, "our farm is paid for."

To be sure it is not in quite the shape we would like it, but we are improving it every year, and hope before long to have our buildings and surroundings in a neat and orderly condition.

HOW TO KEEP THE MORTGAGE OFF THE FARM.

BY J. A. MCFARLIN, PLYMOUTH.

[Read before the Marshall County Farmers' Institute]

There have been some very excellent talks and papers delivered before this Institute in the last two days, touching largely on the sentimental part of a farmer's life. I take it that it is a very necessary part of a farmer's duties to earn a home and keep the mortgage from taking it from him. My paper will be along that line. I am not the oldest farmer in this institute, nor the oldest resident of the county present, but I can very well remember the time when a farmer and his family were surrounded by entirely different conditions from those that confront us at the present time. I was born in this city forty-eight years ago, and thirty-five of the years I have been permitted to live, have been spent on a farm in this county. Practically, all my life the farmer's interest has been my interest. It is now, and I expect to be a farmer the balance of my life.

For that reason I have watched those changes come around us, and have given some thought to what we must do to meet them successfully. I do not want you to think that I even pretend to have at all times followed the suggestions I am going to make to you. The personal experience I have gained in the successes and failures I have made in my life and upon the farm, and what I have observed going on about us for this thirty-five years, are the basis of my conclusions and the candid talk I give you in this paper. I have no apology to offer for the opinions I express. My only fear is that I will not be able to present them to you as I would like.

To a busy people the wheels of time roll around so surely and so rapidly, each day bringing some new duty to engage our minds and attention that we actually have to force our thoughts from the present and place them on the past to comprehend the changes that have occurred in the last fifty, forty, twenty and even

ten years. In fact, when we think about it we can see that there is a constant change in our way of living. Expenses are constantly growing larger and it requires a corresponding change in our way of farming and doing business to even keep pace. They who stand still are rapidly left behind. They who keep pace in the manner of living and make no progress in the art of farming, stock growing, dairying or gardening, or in some of these branches, will surely become a bankrupt. There must be an increased income to meet an increased expense. Forty and fifty years ago the expenses of a farmer in Marshall County on his farm and in his home were very light. His wants were few and mostly supplied from his own farm. He cut his grain with a grain cradle and mowed his grass with a scythe. His wife and mother spun and wove cloth for most of the clothing for the family and made it into clothes with a needle. But year by year our wants have grown, until we have to meet the expense of buying and keeping in repair our binders and mowers, drills and cultivators, musical instruments and furniture, carriages and harness, more expensive clothing and sewing machines; in fact, we live in an age of ready made clothing and sewing machines. Our insurance and our taxes have grown apace. When we think of it it will require no argument to convince us that the expenses of the average farmer have been doubled and trebled during the lives of most of us. And let me ask you if you honestly think we have advanced as much in the manner of making money as we have in the ways of spending it? We have worked hard enough with our hands during those years, but I am afraid we have allowed our brains to lie idle too much of the time, or allowed them to work on things that are not of as much concern to us as this question is.

I believe it is possible, by putting more thought and intelligence, connected with better business methods, in our farming, to increase our income largely, but it is just as necessary to examine the items of our expenses, to see where we can lessen them with the least self-denial on our part. While it is hardly within the scope of this paper to inquire of ourselves what causes have brought about the changes, we can see and feel it might not be amiss. Probably the greatest reason is in the enormous increase in population. Formerly nearly every person who lived in the country was a producer of the products of the farm. Gradually as our numbers have increased we have divided into two classes, either a producer or a consumer. That part of the people that are classed with the consumers of our products have to be employed at something to enable them to pay us for what we grow. They have been making all those articles we now use, and have employed agents, good talkers, to sell those articles to us. They, the agents, in turn, have done their work well; in fact, they have persuaded us to buy more of their goods than we could well afford to own. We should find no fault with the agents; they are only pushing their business as they should. We will have to learn to say no when our circumstances demand it, and learn a lesson from them in business methods.

Then there is another cause for the rapid increase in our expenses. I read or heard a story years ago, and while it may be old to some of you, it illustrates the point I want to make much better than I could in my own words. John Smith and John Jones were neighboring farmers. They were good, personal friends, but

as they grew older in years and a family grew up around each, a spirit of rivalry grew between the families. Smith built a good house in place of the old one. Jones built a better one. Jones bought a new family carriage. Smith looked around and bought a finer one. Smith thought his daughter needed a piano to make music in his home. Jones, not to be outdone, brought home a more expensive one. Finally Jones was called to pay the debt of nature we all must pay, and he left this world of rivalry. His family, with loving tenderness, buried him in an expensive casket and erected over his grave a grand monument, and after much thought inscribed the following epitaph upon it: "Here lies John Jones, snug as a bug on a rug." Time, that waits for no man, soon called Smith to join his neighbor in the other world. His family, with greater tenderness, buried him in a finer casket, erected a more expensive monument over his grave, but the Jones epitaph was hard to head. After thinking long and deep they came out ahead with "Here lies John Smith, snugger than that other bug on that other rug." I am of the opinion that the spirit of rivalry illustrated in this story has been largely instrumental in increasing our expenses, but it is a false pride, and we can not afford to be influenced by it in our lives nor in our burial.

Now if it is possible, by good management and economy, to lower our expenses and at the same time, by an intelligent effort on our part, increase our incomes the problem of how to meet the changed conditions will be solved, and we can do both. And right here I would like to attract the attention of the young people, who are just beginning the battle of life. I hear the remark so often from the younger people that there is no chance for them to get a start on the farm such as there was years ago. In that, I believe they are mistaken. While the conditions have changed the opportunities for young people are as good, or better, at the present time than they ever were. By practicing the same self-denials and economies that successful beginners did years ago, and at the same time taking advantage of the opportunities in their reach that the older people did not have for making money, they can succeed finely, but if they gratify every whim and fancy of their wants and stay in the same old ruts their fathers made in the way of making money on the farm they will fail miserably.

Forty years ago the farmer that owned and rode in a carriage in this country was a nabob among his fellows. Now we all ride. It must have been in an earlier day or in some other country than this that the Irishman's soul overflowed with poetry and weariness and it broke fourth in this rhyme:

The rich they ride in chaises
And the poor they walk, be jases.

At a rough but conservative estimate Marshall County farmers pay each year \$25,000 for buggies and repairs.

While the binder is a necessity it is a very expensive one. A man can afford to pay \$25 a year to get his cutting done better than he can own a binder. They are only used a few days in a year, and there should only be enough binders in the county to cut the grain grown without waste, and they should be in the hands of the most extensive grain growers.

I have concluded to my own satisfaction that I can hire from 25 to 50 acres a year cut cheaper than I can own a binder. Nearly every farm in the county has its binder, and the amount of money it costs to buy and keep them in repair is surprising. One-half the number could be made to do the work, with a great saving in expense. A careful scrutiny all along the line of our expenses will enable us to cut them down without calling for too much self-denial nor lessening our power of production. Not with a desire of being miserly nor stingy, but with a determination to keep our expenses at least even with our incomes.

It used to be thought that when a man could chop, plow and swing a cradle well he was a good farmer, but those days have gone by, never to return. A farmer may be strong, healthy, temperate and industrious. He and his family may work hard early and late in an aimless unthinking way, and yet fall behind and fail to make farming a success. While his neighbor, with perhaps not as good advantages, and with less hard labor, is making a success on the farm. We see these cases all around us. The one is depending entirely on muscle, while the other is using his brains, and taking advantage of every opportunity to meet the changes as they come. We commonly speak of this class of farmers as good managers, and it goes to show us that the difference between success and failure on the farm is not owing to luck nor chance, but entirely a matter of management.

If you will make a list of farmers you are acquainted with who have been successful in the last ten years, you will find that they, without exception, have been specialists. They have studied the nature of their soil to find what it was best adapted to, and have put special thought and labor on that branch of farming that best suits their soil and surroundings, not to the entire neglect of all other crops and stock. But they make their profits from their specialty.

I have watched the success of these men in their line, and the failure of many of those who try what is known as diversified farming, until I am a specialist in principle if not in practice. I don't believe it is best to scatter our energies over a dozen branches of farming like shot from an old shotgun, doing no particular execution anywhere. But we should *concentrate* the best part of our time and attention on some one line and do it well, and produce an article so good that consumers will want it and be willing to pay us a good price for it.

We must use every means in our power to increase the yield of our crops by enriching the soil, and by using good seed and superior cultivation.

There is failure in growing forty bushels of corn to the acre and selling at the prevailing price. While, on the other hand, there is a good living for us, at least, if we manage by care and attention to nature's laws to increase our yield to sixty bushels and get thirty five cents for it, by feeding the good hogs or cattle as we can, at present prices.

It is not the rough outline of a plan of work alone that we need, but we must work the outlines by watching and attending to a score of little details that are easily neglected, when neglect will bring failure. We must organize to concentrate our powers for the general good. A mob can never compete successfully with an organized force. We must educate to be able to use our powers wisely. We must brighten up, keep posted, take enough good papers, be sure you get the

results of the Experiment Station, at Lafayette. Let the boys take the short course at Purdue. The boys nor yourself will never regret it.

And in conclusion let me say if we will increase our incomes by producing a good article that will attract buyers, and strive to increase the yield of our crops, and by that means cheapen production and increase our profits. Give ourselves and families all the comforts and luxuries of life we can afford and no more. Buy liberally when you can. Practice self-denial when we should. Then we will have solved the problem of how to meet the changed conditions successfully.

OUR MUCK SWAMPS—THEIR DRAINING, CLEARING AND CROPPING.

BY W. J. RITTERSKAMP, FREELANDVILLE.

[Read before the Knox County Farmers' Institute.]

In the past ten years there have been drained, in our State, between fifty and one hundred thousand acres of these marshes and swamps, thereby converting unhealthy, unsightly reptile and insect breeding places into the most fertile and pretty fields imaginable.

This transformation requires very hard labor and considerable outlay of money.

The first draining is mostly performed by steam dredgers or ditchers, and it was only through the instrumentality of the latter that these vast surface ditches or canals could be constructed successfully. These canals carry away to large creeks or rivers the influx of water brought down from off the surrounding higher lying country, and serve also as outlets to the underground tile ditches made later on.

Before crops can be successfully grown on these lands the construction of a system of underdraining or tiling is of the greatest importance. It is well to have the grade of every proposed line of tiles established by a civil engineer before beginning to underdrain; especially should this be done in the level ponds. Water-level is a good guide to follow, as water will seek the lowest place to pass off, but in ditching these ponds there is often so much water as to interfere seriously with the work. In having the engineer's grade chart, and, by the aid of his targets and spirit level, the experienced ditcher can do far more satisfactory work than by any method yet devised.

The distance these lines should be laid from one another varies greatly; from six to ten rods seems to be the range adopted by the majority.

The depth at which the tile should be laid must often be determined by the outlet; five feet would be none too deep, if an outlet could be found at so great a depth. This deep digging would increase the cost of laying each individual line considerable, but as the range of drainage sideways increases in proportion with the depth of the ditch, thus requiring a less number of lines to drain a given area, the cost of deep drainage is probably the lesser.

Three to four feet is the depth most generally adopted, owing, in most cases, to the shallow outlet. The deeper the drainage the greater is the capacity of the soil to hold moisture during a summer drouth; it also furnishes a larger reservoir to take up the water which a long continued rain would otherwise spread over the surface. The air admitted to the subsoil purifies and sweetens the otherwise sour nature of same, and helps to make available the plant food locked up therein.

The size of tiles to be used is an important question. One can hardly use them too large, but the mistake made most frequently is using too small a size for the amount of water expected to pass through them. If the size of tile is large enough, water falling on such land is very quickly removed, as the porosity of the soil admits of quick passage to the tiles.

For the drainage of every ten acres a six-inch tile should be used at the outlet and quite a distance up, if possible. Never use less than a four-inch tile for even a short lateral. A four-inch pipe will carry more than double the water a three-inch is capable of doing, and the cost of digging and laying is the same for both, while the price of tile is only about one-third less for the smaller.

To clear these lands for the plow, there is generally a dense growth of crooked-wood, willow, ash, cottonwood, etc., to be removed. It will well repay the cost to take out top and root, "grub out," of the first two named. A strong team of horses and good chain, handled by two men, can root up quite an area per day of the crookedwood, as the roots run very shallow. The smaller willows and cotton trees can be removed the same way, while the larger trees had better be cut down and removed, when, after two or three years' cropping of the land, the stumps can be mostly twisted out with chain and team, also.

Before plowing the land remove all litter and trash carefully and burn it. By plowing this roughage under you will interfere with the capillary movement of soil moisture. Grains of corn have lain for six weeks, sound and unsprouted, where they were planted by the drill, on places where the plowing under of corn stalks, etc., caused a cavity underneath, thus cutting off moisture from below. Roll and harrow the land shortly after plowing, as it will save considerable work afterwards in preparing it for planting. This applies only where the land plows up loose and reasonably dry. There is no kind of soil harder to pulverize than a sun-baked muck clod. Keep all stock off of such lands when rainy, wet weather prevails, or when ground is thawing out in spring.

As to crops to be grown on such land I would name corn first and last. Sixty bushels of ears is considered only an ordinary crop, while one hundred bushels per acre is a common occurrence. Potatoes and cabbages do well where the land is safe from overflow. The water standing one hour on the surface after the crops are planted, will generally ruin the two last named.

Whether or not the planting to corn and potatoes of such vast areas of reclaimed low lands has helped to bring on the very low prices prevailing in the last two years of the above named staples—corn and potatoes, I will leave to the consideration of the reader.

The charge often made, in late years, that this draining of our swamps has caused our severe summer drouths in recent years, I think is false.

One thing I do know, that the status of health of our people is much improved in such districts adjoining these former swamps, and in case of summer drouths causing a serious shortage of corn on the uplands, it is very convenient to have stores of the article close at hand in these rich oases with which to feed and fatten the stock raised on its borders.

SOIL FERTILITY.

BY PERRY K. COTTON, MOOREFIELD, INDIANA.

[Read before the Switzerland County Farmers' Institute.]

Those that are old enough to remember the virgin soil of fifty or more years ago will remember with pride the great crops of corn and potatoes that were gathered from the newly cleared land, and such rich pastures and such crops of timothy hay as were harvested in those days. Such soil is the farmer's ideal of richness. The "wild nature of the soil," as they termed it, had to be removed before they could successfully grow wheat or oats and such like crops. All this is changed now. Much of this richness has gone. We have but little trouble now with our oats or wheat or like crops being thrown down by an excess of richness in the soil. For many years the soil has been feeding us, while we have given it but little in return. The roots of the original forests are gone. They served the purpose, to some extent, of drainage, and in their decay furnished a certain amount of fertilizing matter. The leaf mold and all other vegetable matter has gone, and with it much of the chemical elements of fertility. The earth has become hard, washes into gullies readily, and much of it forever gone, so far as man is concerned—leaving that kind out of our consideration. Let us look after that which is not so far gone and is still worth reclaiming. We are told that such land can not be brought back to a paying state of fertility except by the liberal use of commercial fertilizers. The manufacturers and agents of fertilizers are always anxious to impress this on our minds. Professor Latta in an article published several years ago said about the same. The richness of the virgin soil that was the delight of our farmer fathers fifty years ago was not the result of the use of commercial fertilizers, but was the result of the disintegration of the rocks and the decay of vegetable matter. It is true that commercial fertilizers are convenient both to transport and apply, but our lands are in need of something more. Commercial fertilizers may be used year after year and the soil will not be brought into the fine porous and lively condition that is necessary to the successful growth of a good and paying crop. Take for an experiment, if you wish, an old field that is destitute of vegetable mold or humus, apply the best commercial fertilizer you can buy and the chances are twenty to one you will not get a paying crop.

The question, then, is this: "How can these old fields be reclaimed and brought back to a paying state of fertility?" The answer is, "Follow nature."

Nature enriched the soil originally by covering it with vegetation and filling it with roots. We can do the same thing again if we will. There is, in my neighborhood, a hillside that, when I was a small boy, was denuded of its soil; nothing but stones were visible; the farm stock of the country roamed at will; if some green thing had struggled into existence it was quickly devoured. So barren was that hillside that had a crow decided to have spent a day there he would have been compelled to carry his dinner with him. The owner of that hillside near twenty years ago, while enclosing some other land, found it convenient to enclose a portion of this hillside. Nature at once took the matter in hand. The results were small, at first, but nature never despairs nor gets discouraged, but works on, whether the results are great or small. A great change has come over that hillside. Bushes, weeds and vines have covered it up. Seventy years ago corn was grown on that hillside. Seventy years hence corn may be grown there again if nature is left alone. Any vegetable growth on the ground is better than nothing. Many weeds contain considerable fertilizing matter. But weeds are not to be recommended or relied on as a green manure to be turned under for a crop. Clover is the farmer's sure anchor of success. Of course, we should make and save—yes, save—all the fertilizing matter on the farm we can, but after so doing the supply may fall short of our wants and not be sufficient in amount to help start the grass or clover, then we may help out the supply by some suitable commercial fertilizer. If we can once get a catch on these worn out fields we are on the road to paying fertility. Nor will it require such a great length of time or outlay of money to put new life into these old fields or to make them productive to a paying point. It is the cheap way, it is the sure way, it is the only way that is practical. We have said it is the cheap way, which is true, because of the cost of commercial fertilizers being too great. In six years, 1890 to 1895, there was sold in Indiana 208,750 tons of fertilizer, as follows:

1890	29,000 tons
1891	26,750 tons
1892	35,000 tons
1893	38,000 tons
1894	35,000 tons
1895	45,000 tons
Total	208,750 tons

This, at an average price of \$25 per ton, for the six years amounts to \$5,217,750

Much of this was used with a view of increasing the current crop, and not to increase the fertility of the soil for future crops. Is it not probable that the outlay was greater than the returns would justify?

At the beginning of the present century there probably was not fifty white people in Switzerland County, and probably not more than fifty acres of land in cultivation. Now, as the century is closing, is it not in evidence that we have well obeyed God's first command to Adam, which was to subdue the earth? Well, we have subdued it. There is no mistake as to that, as acres and acres of worn out land and stony hillsides will fully show. Some of this destruction seems unavoidable; much of it need not have occurred.

Mr. Carpenter, in one of his letters, which was extensively published by the agricultural press a few years ago, tells us that in Japan much of the land is as fertile as it was a thousand years ago. They have but few farm animals, and do not use any commercial fertilizer. No waste is allowed. Everything not otherwise used is returned to the land. By a similar course of saving everything not otherwise used and returning it to the land, together with a wise course of rotation of crops, with plenty of clover or some other good fertilizer as a part of that rotation, and thorough cultivation, we may hope to regain and then retain some of our lost fertility.

THE CONSERVATION OF MOISTURE.

BY MORGAN CARAWAY, GEM.

[Read before the Hancock County Farmers' Institute.]

The leading problem in farming should be the preservation of moisture. An intelligent investigation of the subject implies a knowledge of a few fundamental principles that underlie successful farming. The first that we will consider is the physical construction of the soil. The United States Department of Agriculture has made a classification of soils, based on the number of soil particles or grains that can be placed side by side on a linear inch, as follows:

50 to	100	grains	medium	sand.
100 to	250	"	fine	"
250 to	500	"	very fine	"
500 to	2,500	"	silt	"
2,500 to	5,000	"	fine silt	"
5,000 to	400,000	"	clay	"

The volume of water that a soil will hold for plant use varies with the size of these soil grains, sand holding a less quantity than silt and the latter less than clay. As the smaller the grains in a given volume of earth, the greater will be the surface that will be exposed to the water. Professor King of the Wisconsin Experiment Station has illustrated this principle as follows: A marble one inch in diameter that will slip inside a cubic-inch box presents 3.1416 square inches of surface; reduce the marble to one-tenth of an inch in diameter, and one thousand of them will be required to fill the same box. The surface of these 1,000 marbles will be 31.416 square inches; decrease the diameter of the marble still further and a greater number will be required to fill the box, and the surface of marbles will be proportionately increased. A soil in which 1,000 grains will lie side by side on a linear inch is medium fine silt and if a quantity be placed dry in a box it will occupy just one-half of the space in the box, leaving one-half of the space between the grains. If the box be now filled with water it will hold one-half its volume in

water. If the bottom of the box be perforated to permit the water to drain off, one-half the water will leave the soil, and it will hold, clinging to the soil grains, twenty-five per cent. of the volume of the box. As the soil grains increase in size, the smaller will be the volume of water that will be held, until coarse sand will hold as low as ten per cent. while fine clays will retain as high as forty per cent. of its volume. This water clings to the surfaces of the soil grains and tends to maintain itself equally distributed about these throughout the volume. So if by evaporation or otherwise in any part of the volume any portion of the soil grains should lose a part of the water that clings to them the adjacent grains will give off a part of the water that clings to them to supply the deficiency in the former.

This action causes the water to pass downward, upward or laterally in the soil, seeking to preserve the equal distribution. Hence, the greater the depth of pulverized soil, the greater will be the quantity of water held for plant growth. A medium fine silt, as has been illustrated, one foot in depth, will hold for plant use three inches of water, and if we increase the depth of pulverized soil, with the subsoiler, which does not turn the soil as a plow does, but merely loosens it from its compact condition, we will increase the amount of water retained. We will next consider the volume of water required in plant growth. This will vary with the character of the plant and the stage of its development. Corn requires about 300 pounds of water to mature one pound of dry material. During its growth until the time of tasseling eighty per cent. of the plant is water, and from that period until maturity the per cent. of water decreases. Clover requires 400 pounds of water to mature one pound of dry material. Eighty-six per cent. of growing clover is water until it begins to mature, when it gradually decreases to fifteen per cent. at maturity. Oats requires 500 pounds of water to mature one pound of dry material, and during its process of development the conditions are similar to clover. The task before the farmer is to supply these conditions and requirements.

The natural conditions in Indiana are such that we have, supplied by the rainfall every year, a sufficient amount of water to grow and mature any crop that is adapted to this climate to complete perfection if it can be saved and applied at the proper periods of plant requirements. The great losses are by surface drainage and by evaporation. The soil should be put in proper condition by the plow, subsoiler and cultivator, to such a depth that it may take in and retain the largest possible quantity of rainfall. The soil can thus be loosened and pulverized to a depth of twenty to twenty-four inches and the fertile elements retained near the surface. This condition will cause the soil to take up and hold from four to six inches of water. After this is secured then we must assist it to retain it. For, as we have shown, there is a tendency to maintain the equalization of water on the soil grains. When those near the surface are robbed of their moisture by the action of the heat and air, the above principle continually brings the water towards the surface until the soil is robbed to such a degree that it can not supply plant growth. This must be prevented if possible. This can be done best by the spring-tooth harrow or cultivator that loosens and stirs the surface soil to a depth of two or three inches. When thus loosened its particles are removed from each other so that the water ceases to pass through it and come to the surface.

This cultivated surface acts as an artificial mulch and fills the functions that nature has provided in the dead leaves of the forests and the decaying rank grasses of the prairies. When additional rainfall comes it readily passes down through it to the soil underneath. A heavy rainfall will compact the surface and destroy its condition as a mulch, and it must be again cultivated. This process should be continued during the entire growing and maturing periods of the plant's life. While other natural conditions and laws of plant life and growth should be comprehended in this connection, the limit of this article prohibits their consideration.

FARM CROPS.

FRUIT GROWING FOR PROFIT.

BY THOMAS T. NEWBY, RUSHVILLE.

[Read before the Rush County Farmers' Institute.]

This subject, which has been assigned to me, is too extensive to be fully treated in one short paper, and inasmuch as the apple is of more importance to us than any other, or even all other tree fruits, I shall confine my remarks to it. An orchard for profit, from which to get the greatest money returns, should not consist of too many varieties, and yet there should be enough to give a succession of fruit the whole season, or really the whole year. A few for summer and fall, but mainly winter varieties. This is certainly best for a large commercial orchard. You want many barrels of one variety, rather than a few barrels of many varieties. Probably one dozen varieties that are good bearers, and make a fine appearance on market, would give much better returns than a similar orchard composed of one hundred varieties. In planting such an orchard I should not like to omit the following varieties, viz.: Maiden Blush, Rambo, Sutton's Beauty, Grimes' Golden, Hubbardston's Nonsuch, Smith's Cider, Rome Beauty, R. I. Greening, Vandevere Pippin, Roman Stem, Winesap and Ben Davis. A sweet apple is not very profitable for market. According to our present standard, for an ideal market apple, the tree should be a healthy, vigorous grower and an early, regular and enormous bearer. The apple should be large, not flat, but oblong in shape, it should have a smooth, glossy skin of a bright red color, making a fine appearance; it should be sub-acid in flavor, and of moderately good quality; it should be a long keeper. In a word it should be Ben Davis—the poorest good apple I know of.

It is not best to set a large block of fruit trees of one variety by themselves, but alternate the varieties in rows and thus secure better cross-fertilization. It is now a well-known fact that at least some varieties will produce more perfect and better

fruit if the flowers are fertilized by pollen from some other variety. For an orchard for home use or nearby market I prefer a goodly number of varieties. There is a surer chance to have some fruit every year.

The soil of an orchard should be kept in good fertility and when not cultivated and the trees are large, a heavy mulch of half-rotted straw spread all around under the limbs as far out as they extend, is an excellent thing to retain moisture in case of drouth, and is thus a great help to develop fine fruit.

Pruning should be properly attended to, all water sprouts and dead or broken limbs removed, and others not allowed to cross each other, and heads thinned out where too thick for sunshine and spray to get in. In pruning leave no long stubs to prevent quick healing, and paint large wounds with something to prevent decay. Perhaps shellac varnish is best for this. March is probably the best time of the year to do the work.

A spraying machine is an absolute necessity in orchard management now. We have fungous growths and many forms of insect life to contend with, but a good machine and a knowledge of the habits of the enemies and the remedies to apply, we may hold them in subjection.

There are, however, a number of varieties of scale that infest fruit and other trees which are very difficult to get rid of. They are sucking insects and feed and live by drawing with their little pumps the sap, the very life out of the limbs and leaves. Kerosene emulsion, made very strong and used when the leaves are off, is the most effectual remedy. The variety on exhibition on fruit tree limbs here is the scurfy bark louse scale and is very common in orchards. There is another variety, the San Jose scale, which works on many kinds of trees and is spreading over the country and giving great alarm to fruit growers. It is in the East and in Illinois and has lately appeared in some of the peach orchards of northern Ohio, and already \$50,000 worth of trees are ruined by it. Their State Entomologist, Prof. Webster, informs them that the only sure remedy is to dig up and burn the trees, which is being done. The insect is said to be quite small, almost microscopic, and may be carried on the feet of birds or blown from tree to tree by heavy winds. It may be scattered broadcast by infested nursery stock, and this should be guarded against by procuring no stock from districts where it is known to exist.

The two past seasons, for some cause not easily explained, there has been but little apple scab, while in other years some varieties were almost wholly ruined by it. It may or it may not come this year. We can not tell until it makes its appearance, and then it is too late to make much of a fight against it. So the only safe plan is to do the spraying. Use copper sulphate solution early in April, before the buds begin to swell, then the Bordeaux mixture once or twice after the bloom is off.

Then for worms, which are the larvæ of the Codlin moth, two sprayings should be given of paris green. Three ounces to fifty gallons of water is about right. The first as soon as the bloom is all off, and the Bordeaux mixture may be put in and given with it if desired. In eight to twelve days spray again with the paris green solution. I wish to insist on the importance of these paris green sprayings, and the work must be done promptly and thoroughly, as on this alone will largely depend the profits of the crop. In proof of this I refer to the fact that I sold over 250

bushels of the last of my crop of 1893 at seventy-five ¢nts per bushel, when there were plenty of unsprayed apples on the market at 50 cents per bushel, or even less than that, but they were wormy and faulty and had to sell on their merits. And the paris green did it, and only cost about \$1.50 and two days' work for two men and one horse to spray about two hundred and thirty trees. The pump and fixtures cost \$10, but had been used the four years previous.

Another thing of importance is thinning the fruit. This should be done early when it is one-third grown, or still better if before that. To do this go over each tree and pick off by hand all small, knotty or faulty specimens and do not hesitate to take the finer ones if there are yet too many on. Leave no two fruits touching each other, and six inches is not too far apart, but a fixed rule can not be given. The remaining fruit will be much larger and finer and it is claimed there will be as many bushels as if all had been left on. If properly done it will prevent limbs from breaking and the tree will not be so overtaxed in ripening the fruit but that fruit buds may be developed for a crop the next year. The main cause of the short crop here last year doubtless was that the enormous crop of 1895 could not be matured and at the same time develop fruit buds for another year. There really was but a comparatively small apple bloom here last year.

Summer and fall apples should be used or marketed as soon as ripe, as they can not be kept very long. And here I would remark that the ripening of all fruit is but the beginning of decay. And with every variety there is a time when it is at its best condition for use. This time may vary in different years, owing to ripening earlier or later than usual, the manner of keeping, and possibly some other causes. By "cold storage" the ripening process may be delayed or prolonged almost indefinitely, but "cold storage" is not yet practical to the common farmer or those who grow fruit in a limited way on account of the heavy expense. So then we must do the next best thing. The ordinary cellar is not a very good place to keep winter apples. A house above ground is much more suitable and it need not be very expensive. Build of any desired size with a good solid foundation with walls on this at least one foot between weather boarding and ceiling, and if two feet it would be all the better. Fill this space with sawdust and overhead to the same depth. Such walls will keep out heat in hot weather and keep out cold in cold weather. It should have a door with a shutter opening on the outside and also one on the inside with a screen door between them. There should be a small window opposite the door with two sashes on hinges opening in and out with a wire screen between them. A small ventilator in the center overhead is necessary to take off any foul gas that may accumulate. A brick floor answers well, and everything should be absolutely mouse-proof. Such a place will keep apples and Irish potatoes nicely and also some other things that should be held at a low temperature.

Now, as a rule, apples that are kept longest in good condition bring the greatest profit, so in storing for winter we should keep this in view and use every precaution to accomplish it. They should be picked before much frost and handled as carefully as if they were eggs. A half bushel basket with a bit of flannel fastened in the bottom of it to prevent bruising, and a stout wire hook to the handle to hang to the ladder or limbs, is better than a sack to pick in. We must use

all care to prevent bruising, yet if the skin is not broken decay does not usually begin at once, but the little cells being crushed the fluids gradually evaporate, leaving the tissue dry and discolored, which, of course, is not desirable. Scientists tell us that our atmosphere is always full of very minute organisms called microbes, and among the many kinds there are ferment microbes, so if the skin of a fruit is broken or punctured ferment microbes enter at once and begin their work of fermentation and then follows decay. Inasmuch, then, as we have this condition of things right here in our surroundings we do not have to send off 240,000 miles to the moon to get her to do this dirty work for us.

In picking give the apple a kind of lift and leave the stem on the fruit. This, however, is not always practical, as some varieties require more force to remove them than others. Take them at once to the fruit house and sort over carefully, leaving out all that are rotten-specked, wormy or otherwise faulty. It is of no use to put up such for long keeping, as they are sure to rot, and by contact mar many others. Store in bins, boxes or barrels as may be convenient. Several together keep in better condition and ripen up better than do just a few. But keep each variety to itself. If stored in headed barrels lay them on their sides, as it makes much less weight on the bottom fruits. All russet apples should be kept in tightly closed boxes or barrels to prevent shriveling. The rough skin they have permits much more evaporation from its surface than does the smooth, glossy skin of others is the cause of this, and tight boxing measurably prevents it. In storing put the long keepers where least accessible.

The house should now have daily attention. A good thermometer should be inside and the temperature held as close to 40° as may be. To accomplish this open the door and window, leaving the screens shut every evening and close up tightly every morning. A decided reduction in temperature may soon be observed, even though it be quite warm in the day. Later on in the season, in case of a long continued spell of extreme cold weather, a little heat may be necessary. A natural gas jumbo somewhere near the floor of the house is just the thing, and but little heat can rarely be used. In the absence of this, a two-gallon kettle of live coals will suffice for one night, or a common lamp might answer. But we must remember that heat hastens ripening and ripening means decay, and just as an apple does not freeze it is all right. So we must guard against both extremes.

The different varieties should be watched closely and whenever one is at its best it should be used or marketed. In marketing take none but first-class fruit and never mix varieties. They will not cook just alike, and to sell a mixture to eat out of hand is a nuisance. Should a customer purchase a peck of Rambos, and on reaching home find them half Ben Davis, he would justly feel indignant,

For a near-by market bushel boxes are convenient to take them in. And when you sell a bushel let it be a bushel. Do not use a grain sack to market in, as the fruit is sure to be bruised and very liable to get "all mealy and dirty" in the sack. We frequently see apples on market muddy and repulsive, but otherwise good, and purchasers pass them by. Had they been washed or rubbed up a little, the whole appearance would have been changed and they would have gone off first-class. So we may count condition and appearance as being on the side of profit.

For shipping the common flour barrel, which holds three bushels, should be used. They should be filled with fruit of the same variety and of uniform good quality from bottom to top, never "topping out" with finer specimens, if you wish to build up and hold a good trade. The name of the variety and grower should be plainly marked on each barrel.

Windfalls that are not marketed, and others that are not first class, should be dried, made into cider for vinegar, or fed to stock, and in this way some profit is realized.

Thus far I have only had in view the money profit of the business. But there is another profit in it which, I think, at least to the ordinary farmer, outweighs all other considerations. It comes in by having an ample supply of his own growing for home use. It promotes health, home pleasure and enjoyment which can not be measured by dollars and cents. And in conclusion I would urge all farmers to grow not only apples for home use, but all other tree and small fruits that can be grown here. If we neglect this, we fail to do our duty by our families, and fail to live up to and enjoy the privileges that are placed within our reach by an all-wise and bountiful Creator.

TOMATO CULTURE AND ITS PROFITS.

BY B. R. PRATT, SHARPSVILLE.

[Read before the Tipton County Farmers' Institute.]

The tomato is a native of this country. It was grown by our ancestors in their gardens on account of its beauty, and was used as ornaments to be placed on mantels or stands, to be admired. They were called love apples. The people did not, at that time, think they was fit to eat. Indeed, our parents can recollect when very few persons used them. During the last score and a half of years the increase in their use has been very rapid. We now consume, annually, in this country, about three and one half million cases, of twenty-four three-pound cans each. So, what was once grown as a curiosity is now produced in large quantities and forms, one of the staple articles of food.

In this paper, under the head of culture, I will include all labor of producing, setting, and cultivating the plants. To insure a successful crop, a good, early plant is a necessity. Then, every tomato grower should think of what is said about the early bird. Many argue that the best way to grow plants is to plant the seed in cold beds or the open ground; but this makes the plants too late to secure more than an ordinary crop. Hence, I consider what is commonly known as a hot-bed, is necessary, that we may have the best plants possible.

The first thing a man who is going to put out a crop of tomatoes should do, is to select a location for his plant bed. Of course he could grow his plants almost anywhere, but some places are much better than others. Locate your plant bed

on a southern slope, or the south side of some fence or building. You will find that any protection on the north of your bed will be a great help, having selected the location of the bed, prepare a frame for holding the heating material and the necessary top dressing of soil. There are two methods of making these; one by making the entire bed above ground and the other by digging into the ground for a portion of the space necessary. Which is the better way is difficult to determine, each having its advantages and disadvantages. The advantage gained by digging into the ground is twofold. You get a cheaper bed and one that is naturally warmer than one on the top of the ground. The bed on top of the ground has this advantage: in case of continued wet weather you can keep the heating material from becoming water-soaked—a condition which ruins your bed.

To construct a bed partly beneath the ground remove the dirt to the depth of twelve inches and as wide as desired. From five to six feet I think the most desirable width. In removing the dirt, place it all on the north side of your bed. Construct around this excavation or ditch a frame of plank at least twelve inches wide, placing the bottom of the plank on the south side level with the top of the ground and those on the north enough higher to give the proper slope to run off the water when covered. Stay these boards by nailing upright pieces to them on the outside, which extend in the ground to the bottom of the trench. You are now ready for your heating material.

The frame for the bed above ground is made in a similar way to the one already described, only you have to use enough lumber to make it high enough to hold all the necessary materials for the bed.

The bed frame being completed, and the proper time having arrived, proceed to haul the material for heating purposes, which is fresh stable manure, with which has been combined quite a good deal of litter as bedding.

The manure should be hauled several days before you wish to plant your seed. In hauling the manure, throw it in the center of the frame, heaping it up in a ridge the whole length of the bed, and putting in enough so that when leveled down and packed thoroughly it will be about one foot deep. Do not level the manure down at once, but let it stand until it heats pretty thoroughly. If the manure is very dry, a good wetting will make it heat quicker than it otherwise would. A good rain just after the manure is placed in the bed is just what you need. When you go out in the morning and find the heap of manure smoking from one end to the other, you can proceed to level down the manure, being careful to move all the manure and mix it thoroughly by placing the heated portions with any parts that may not be heated. Place the hottest manure along the sides of the bed and pack the whole mass as well as you can by tramping it. Make the top of the manure as level and even as possible. Place on top of this, at once, rich soil to the depth of eight inches. This should be very rich and free from weed seed of any kind. Level the soil and let the bed stand until the dirt begins to get warm almost through.

The points gained in letting the manure heat before making the bed are three in number: *First*, By this method the whole mass becomes equally heated; *Second*, It will hold heat longer, and *Third*, The heat will not be intense enough to destroy the seed, or to force the plant along too rapidly. Whatever you do, do not haul

your manure, make the bed and plant the seed, all the same day, for if you do, the chances are that if the seed is not destroyed in places with intense heat, they will come up uneven, owing to the uneven heating of the bed. To have good plants, you must have them all come up in the row at once.

When ready to plant the seed, put them in rows crosswise of the bed. Place the rows from three to four inches apart and the seed in the row about three to the inch. This makes about one seed to every square inch of surface, and will give sufficient room to make good stalky plants. By placing the rows farther apart, leaving the same number of plants to the row, would give better results. The seed should be covered about one-half inch deep and dirt packed down on them. Keep the top of the bed moist below the seed to insure an even germination of the seed. After the plants are up, keep them watered enough to keep them growing nicely. If the weather and bed are both cold, use hot water to give the proper moisture.

I have been growing tomatoes every year for eight years, and I am now convinced of what I have believed for some years. This is, that tomato plants should be transplanted into a cold bed, or the ground where they can have some protection, and be gradually hardened before setting in the field. I believe the proper thing to do is to have early plants and transplant them from the hotbed to the natural ground, or cold bed. The plants from the hotbed are too tender to set in the field, unless it is under the most favorable circumstances.

The plants should be set as early as possible, but not until all danger of frost is over. As a rule, the latter part of May is the best time to set.

In selecting the ground to be used for the tomato field choose the very best you have. The best corn ground is always the best tomato ground. Some think that our lowest swampy soil is best for the tomato, but I think not. I believe the best soil for tomatoes is our higher black soil. If it has a southern slope or is protected on the north and west by woods, all the better.

The ground should be broken moderately early, before the ground has become dry. If the breaking is put off until time to set the plants, and the season happens to be somewhat dry, it will be impossible to get the soil in proper condition to set the plants, and after it is prepared will not have the necessary moisture to start the plant and keep it growing. I think it best to break the ground early and keep it cultivated enough to keep the weeds from starting until setting time.

The plants should be set in rows both ways. There are various opinions as to the proper width of the rows, but I think four feet each way a very good width. I believe one will grow more tomatoes if he sets his plants that width than if he sets them farther apart. Damp, cloudy weather is the best for plant setting, but when the ground is wet I do not believe it pays to set plants. Of course the plants live very well, but it makes the ground around the plants in bad shape. If the ground is extremely dry it will pay to use water when setting plants or wait for rain.

Cultivation can not be begun too soon after the plants are set. The plants should be cultivated frequently enough to keep any weeds from starting. They should be cultivated as late in the season as the size of the plants will permit. Many quit working their tomatoes too early in the season.

About the time you are working your tomatoes the last time, you discover that something is eating a plant here and there. This is all the warning you need. You must immediately begin a war of extermination on the enemy of the tomato plant—the tobacco worm. It is absolutely necessary to keep these gathered off the plants during the early part of the season. If left alone, it does not take them long to cut the crop one-half.

This brings us to the season of the year when we must begin marketing. The tomatoes should be carefully picked from the vines and placed in open boxes or crates, which are then loaded on wagons and taken to the factory.

It is very difficult to figure the cost of producing the crop of tomatoes per bushel, as the varying quantity grown per acre causes a corresponding variation in the cost per bushel. It is easy to approximate the cost of an acre of tomatoes up to picking time. I believe the following estimate reasonable:

Breaking the ground and cultivating the same	\$3 00
Growing plants for one acre	3 00
Setting one acre of plants	2 00
Worming one acre of plants	2 00
Estimating an average yield to be two-hundred and fifty bushels per acre and figuring the cost of picking at 3 cents per bushel	7 50
The hauling at 2 cents per bushel	5 00
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This gives a total cost of one acre of tomatoes	\$22 50
Two-hundred and fifty bushels of tomatoes or seven and one half tons at \$5 per ton	37 50
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	\$15 00

I have made another estimate on the basis of a yield of two-hundred and fifty bushels per acre. This estimate is on the cost per bushel and is as follows:

Raising plants	1 cent per bushel.
Setting plants	1 " "
Cultivating and breaking	1 " "
Worming	1 " "
Picking	3 " "
Hauling	2 " "
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Total	9 cents per bushel.

At five dollars per ton tomatoes bring fifteen cents per bushel which leaves a profit of six cents per bushel. This gives a profit on the two hundred and fifty bushels of fifteen dollars, which is the same as the other estimate.

As the quantity grown per acre increases above the two-hundred and fifty bushels the cost per bushel decreases and as it decreases below, the cost increases per bushel. A yield of one hundred bushels per acre gives a cost of fifteen cents per bushel leaving nothing for rent of the ground, while a yield of four hundred bushels per acre gives a profit of thirty dollars per acre.

I do not know how many tomatoes can be grown on one acre of ground. I am acquainted with parties that have grown six hundred bushels per acre.

We have figured the cost of the tomato to the grower and have arrived at his profits; but let us figure a little further. We find wrapped up in this tomato business an extra amount of work on each acre above that which would have been necessary in the production of ordinary crops. This extra work will amount to about eighteen dollars per acre on an average. There will be planted in the county about eight hundred acres of tomatoes. Eight hundred times eighteen dollars gives fourteen thousand four hundred dollars. There will be paid out as wages at the three canning factories in this county a sum equal to this. This brings into the county the sum of twenty-eight thousand eight hundred dollars, and puts it in the hands of those that need it. This is no mean sum to scatter among the laborers of the county. It would make one man a right nice fortune. It would support two hundred and eighty persons one year. If distributed among the people it probably would be sufficient to give to each man, woman and child in the county, one dollar.

FLORICULTURE.

BY MRS LAURA A. STUART, ANDERSON.

[Read before the Madison County Farmers' Institute.]

Floriculture is one important branch of horticulture. While a large per cent. of this company are more or less interested either directly or indirectly in raising fruit, stock or grain, I would call your attention for a few moments (1) to the raising of plants, vines or ornamental bushes; (2) how best to enjoy them after they have been produced. Having lived in the country a number of years, at a time in my life when the interest and value of home making never could be greater—that is, when one is just married—I felt, then, the great need of beautifying home. What should I do, and when should it be done? were two questions that were continually coming up. What shall I plant? Where shall I plant them so the surroundings will be congenial to their best developments, and at what season? were some of the most difficult problems of this whole matter. After several years of practical experience and many more years of observation as a florist's wife, I shall endeavor to give the practical side of both stages of my experience up to date. I am of the opinion that almost everything will succeed much better if planted in the spring of the year. Right here I would say there is a right way of planting and also a wrong way. Some practical common sense must be used, as well as good tools. Some would plant everything just alike, using only an old knife or hand trowel, while others would take a spade, same as planting posts. There is a difference; plants are wanted to come forth, spring up, develop, produce growth, foliage, flowers, and perhaps fruit, while a post is intended to stay there—remain

firm and solid in the ground. For planting in the yard, should there not be too much shade, take a few rose bushes, such as Hermosa, Paul Neron, General Jack, Mad Testout, Kaiserin, Meteor, La France; for climbing roses, Prairie Queen, Baltimore Belle, Crimson Rambler and Yellow Rambler. The varieties here named, well planted in a sunny place, carefully cultivated and properly cared for, will produce flowers constantly from early spring to late autumn. For vines or climbers the Clematis, Honey-suckle, Wisteria, German Ivy, Ampelopus and others will all do well around almost any door. Plant rather deep in good soil, not hard clay. Snow-ball, lilac, wegelia, spira, sweet shrub, smoke tree, althea and hydrangia are beautiful ornamental bushes that do well almost anywhere. Pæonies, phlox, bleeding heart, hardy sunflowers, pampas grass and others can be procured easily, and any or all of the above named plants are common and cheap, but rich and grand in development and satisfaction. Plant with care when ground is in good order. Mulch with old straw and leaves. Do not fail to water well the first year, at any rate.

Now for flower beds, every home should have summer flowers, if none of the hardy plants above mentioned. Cannas are tropical in foliage and grand in flowering; calladiums, with their massive foliage are fine; dahlies are good, if planted early; salvia makes a beautiful showing planted close to the house; geraniums, verbenas, feverfew, coleus and dozens of others make charming beds, separate or combined. In order to have these do well, prepare ground well, plant and cultivate for a purpose—if you won't get these, buy a few seed, such as sweet pea, petunæ, asters, pinks, sweet alyssum; sow in boxes and transplant when ground is warm and dry. Tuberose and gladiolus are cheap and of easy culture; try them. Do not deal much in novelties; they are too expensive in more ways than one. With the foregoing plants placed around your homes there would be but little excuse for not having cut flowers on the dining table from May till November. Having followed the foregoing suggestions and having been successful in producing fine plants and a bountiful supply of flowers, perhaps a word or two as how to use the same might not be amiss. The object of most plants, in producing bloom, is to form seed. Hence, if flowers remain on bushes till they fade, there will soon be a stop to their appearance, but just before a flower is in its prime, cut it off, give a good stem with some foliage, place in a jar of water in some cool place for a few hours, then arrange loosely, give to a friend or send to some sick, overworked or lonely person to brighten their lives.

Those that are the most liberal with flowers enjoy them the most. Having suggested appropriate plants, seeds, etc., for the yard during spring, summer and fall, I give a few thoughts in regard to plants for the windows during that part of the year they can not be grown outside. As a rule those that have potted plants inside overdo the matter and thereby cause much needless work, worry and disappointment. It is a great mistake to pot up a lot of outdoor stuff in the fall and bring in the house just to save it, or to get several varieties of plants, natives of different countries, requiring different soil, temperature and care, placed in same soil and given the same treatment, and expect good results. You can just as well winter all kinds of farm animals and fowls in one stable. Success in this line is impossible. Plants that have bloomed during summer seldom bloom much in winter. Single

and semi-double geraniums will do fine in winter if they are grown in pots all summer and not allowed to bloom until late in the fall; some fuchsias also. Oxalis is a grand winter plant. Primroses, cyclamen, cinerarias, callas, etc., if grown cool; ferns, palms, pandanas, begonias, dracenas and many others; any and all of these will do well if not grown in temperature over sixty degrees. Plants do not require as much water during winter season, if in proper temperature as they do in summer. Two or three healthy plants about the house is much better than many times that many which won't produce flowers nor nice foliage; neither will they bring happiness to any home. Don't fail to grow some flowers this year; be sure and give your cannas and calladiums an abundance of water daily; don't forget to have a pansy bed on the shady side of the house, where they can get plenty of light; keep all seed pods picked off; try a bed of Mammoth verbenas; have a few coleus out in a sunny place.

"Make your home beautiful; bring to it flowers, plant them around you to bud and to bloom." Make all your efforts in this line harmonize with nature's laws—then success will crown your efforts.

HOW TO HANDLE THE CORN CROP.

BY JESSE LITTLE, LOWELL.

[Read before the Lake County Farmers' Institute.]

Owing to the great fertility of a large part of our country, the average farmer has been able to make a comfortable living and still let a large part of his crop go to waste. The virgin soil has been cropped for years, and in many cases little, if any, fertility has been returned to repay it for the crop taken away.

As the population increases and the soil becomes less fertile, we will be forced to make a better use of our crops. This has been the experience of our friends in the Eastern States and it will be our experience when we reach a similar condition.

To husk a field of standing corn as much of it is husked in this locality, leaves about 40 per cent. of the feed value of the crop still in the field. Although most of these stalks are pastured, to some extent, enough is wasted in Lake County to winter thousands of animals. But, to handle a crop in any other way, will require an additional outlay of physical labor and may need some mental labor as well.

In Prof. Latta's instructions to inexperienced speakers, he warns them to make their papers short, so I will give my experience with the corn crop at once. My first recollection is of going out to the fields when the thermometer was down about to zero to get shock corn for the stock, and, to make things more interesting, part of the shocks would be frozen down, and have to be recut. For sort of a variety, the next week, in the same field, the mud might be hub deep, and no place on the farm clean enough to feed the corn if we could get it. The corn crop was the especial one on which we depended most for fattening our cattle and sheep,

and we felt the need of having it in such shape that we might rely on it every day, whether the ground was frozen or not. To gain a little information in this line, my brothers induced me to attend several institutes. At these institutes, when the corn crop came up for discussion, the dairymen had the floor first, last and all the time, until the chairman would call them down and announce another subject. Their crop, of course, was largely made into ensilage and most of it fed to cows. We also found that the work in this subject at our Experimental Stations was mostly with ensilage or in the interests of the dairy. So, being disappointed in both directions, we decided to try the Porter Feed Cutter. This proved a simple, though effective machine for our work. The cylinder, to which the knives are attached, is about five feet long, which gives the machine a large capacity, probably twice as great as the ordinary husker. The corn is shelled and drops out with the fodder. The coarser butts of the stalks are not only cut, but also torn or shredded. The machine will also shell corn or cut jerked corn very rapidly. Feed boxes were made about 30 inches wide on bottom, with sides about 24 inches high, for medium sized cattle, and smaller accordingly for calves and sheep, which gives the animals room to get at the shelled corn, if they wish to, without throwing the fodder out of the boxes.

We like the feed very much, for both sheep and cattle. Young stock will need only a small amount of hay or straw while on this feed, to make an excellent winter growth. Beef cattle may require some additional grain if on full feed, but do not get the corn so fast as when fed clear shelled corn and will naturally take a few leaves at the same time, and so are not so liable to become clogged as when fed ear or shelled corn separately. If your yards are conveniently arranged, the beef cattle may be given a liberal feed and then the stock cattle follow to clean up what is left.

Any form of cut fodder or ensilage is quite expensive, yet there are advantages in having it cut. Stock will eat it better; it will require less room for storage, it is more convenient to feed and, if it is not all eaten, the remainder is in fine condition to use for litter, makes a good absorbent and is ready to handle as manure at any time. Although we like the Porter Feed Cutter for our work, it is a question that each one must decide for himself according to the use that is to be made of the feed and the necessary cost in preparing it, whether a man shall cut, husk or thresh the fodder or feed direct from the shock.

Ensilage and other forms of cut fodder each may have their good points, yet many of the old cattle feeders that tap the Chicago market and report for the feeders' corner of the Breeders' Gazette, use uncut fodder. But many of the cattle fed in this way have size and age enough so that they can eat the corn and fodder fairly well without it's being cut.

In the fall of '95 we added another machine to our outfit—the Deering Corn Binder. With it an ordinary farm team can easily cut about 6 acres a day and a man shock from 2 to 2½. The bundles are about the right size to feed into thresher or into the feed cutter already described without cutting the bands and are convenient to handle whether hauling the fodder to be cut, fed or stacked.

The amount of twine required varies from 2½ to 5 pounds per acre. The binder is not as well built as it should be and one fault in its work is that too

many ears are broken off and fall to the ground. Also, it will not cut corn that is lodged, as much of it was last fall, but for that matter, neither could a man cutting it by hand make much progress. On the whole, we call the binder a success.

POINTS.

If you have corn crop to dispose of, in the first place, do some thinking. Consider the cost and value of other feeds within your reach, also the cost of cutting and preparing the corn crop suitable for your stock, then cut accordingly. Many were surprised a year or two ago, when we had a shortage in the hay crop, to see how well their horses thrived on corn fodder instead of timothy hay.

Keep your eye on the corn binder and when you think it has passed the experimental age give it a trial.

Lastly it will be better not to let your fodder stand in the field till midwinter, but if it is left, don't let your boy be the one sent to bring it in, for such work at that season of the year is apt to make boys decide to quit the farm.

THE MOST JUDICIOUS WAY OF DISPOSING OF THE PRODUCTS OF THE FARM.

BY J. H. ROHRER, LOGANSPORT.

[Read before the Cass County Farmers' Institute.]

The proposition assigned to me presupposes that the *products* can be disposed of judiciously—that the farmer has studied his farm and available markets and produced only that which can be marketed.

This having been done, the remainder is comparatively easy. Simply “push your goods” in a business-like way, remembering that purchasers will buy where they can do the best and it is right that they should; that honest goods honestly represented, promptness in fulfilling every engagement, even to the collection of bills, good nature and tact, will make you friends and bring you orders.

Do not alienate dealers by retailing at less than retail price. It is not right and certainly not judicious.

Do not complain of low prices, hard times, etc. You are as much to blame for such things as the man who is bored by your whining.

Avoid the crowd. There are times when farmers are generally busy on their farms. These can be foreseen by the observer. You can well afford to make some sacrifice to be on the market in full force at such times; then ease up as the multitude rushes in to break the market.

Finally, don't wait for higher prices. A market report practically contains the combined wisdom of the world as to the value of a thing. If it were certain that it would be worth more to-morrow, next week, or next month, it would be worth more to-day.

Push your goods! Keep sweet!

CLOVER WITHOUT SOWING.

BY E. F. DIEHL, LEESBURG.

[Read before the Kosciusko County Farmers' Institute.]

After one seeding subsequent crops may be grown without being sown by hand, even in a rotation of several years, providing enough good seed is ploughed in deep enough to prevent germination and returned to or near the surface when a clover crop is desired. The vital questions to insure success are: When to turn the seed down, and when up, without much regard to the interval between, as the vitality of the seed—especially unhulled—seems to be preserved indefinitely if well buried, at least longer than it should be kept out of the rotation. The plowing down of seed may be done in autumn, winter or spring, as soon as possible after frost is out.

Spring is undoubtedly the best time for turning seed up.

When only two grain crops—corn, oats—come in the rotation, the seed must be turned down deep enough so that the after cultivation of corn will not disturb it; and the plowing for oats deep enough to turn seed up. If more grain crops are desired in the rotation, say corn, oats, wheat, the oats can be disc or cultivated in on corn ground and then plowed deep enough for wheat to turn seed up.

In cutting mammoth clover for seed, with a self-rake reaper, I leave as much stubble as possible—there is always enough seed left without trying hard. The stubble is plowed in early spring, corn planted and cultivated shallow. In fall wheat drilled in standing corn or after it is cut, and the next fall wheat stubble turned down and the clover seed and rotted sod up, and second crop of wheat sown on an ideal seed bed for both wheat and clover, and this completes the rotation, giving one crop of corn; two wheat, and one of clover in four years by twice plowing the ground and not sowing any clover. Sometimes I omit the corn, growing only two crops of wheat, plowing, of course, for both. My upturning of the clover seed must necessarily be done before sowing wheat—sometimes as early as the latter part of July—yet it is a curious fact that no perceptible growing of clover takes place until the next spring, when a magnificent stand of young clover appeared. The two failures noted above were due in one case to very late plowing in spring for corn, clover probably all germinated; in the other to burning of plow-clogging stubble, the ground being too stony to use rolling coulter on plow.

The reader must not suppose that the plan of plowing down and turning up clover seed will invariably prove a success in the end, for volunteer clover is subject to the same vicissitudes of drought and extremely hot weather, just after the grain is cut, as if sown by hand in the spring. In fact, I have had a good stand in the fore part of summer—by sowing and not sowing—succumb to drought and hot weather, so that by August it was entirely a minus quantity.

If there is a good stand of both clover and wheat in the spring and not enough moisture in the soil for both during the growing season, the clover is sure to suffer and perhaps perish. That was the case here the past two years, and has badly disarranged my rotation. After the young clover had about all perished we had plenty of rain last year, commencing about the middle of July, and, not to be "knocked out" entirely I plowed and prepared twenty acres of wheat stubble. On eight acres I sowed broadcast one-half bushel rye per acre and harrowed with spring-tooth and Acme harrows; then followed with seven pounds of mammoth clover seed and three pounds of timothy per acre and covered by running weeder over. I wanted pasture, and thought out of the three I would get something. I have a splendid stand of all three. I sowed the other twelve acres in Crimson or Scarlet clover, the sight of which makes me feel good. And when I feel real blue and go to the field and dig up a bunch, count the stems, see the mass of roots covered with large nitrogen feeding bacteria, I feel too enthusiastic to write conservatively about it. This clover has a place on every farm where it will grow successfully, but I think never as a substitute, only as a supplement for our common red clovers. I also sowed about ten acres of this clover in corn. All this seeding was done from the 25th of July to August 8th—was all well covered, some with Acme harrow, and the season was exceptionably favorable. So far this winter it has stood the cold test rather better than wheat, owing, I think, to its being so well rooted and protected by a dense, wide-spreading top hugging the ground closely. I am aware this clover has generally proven a failure this far north, and where it has succeeded its height at maturity was disappointing, yet as a fertilizer and winter protector of otherwise bare ground, and for fall, winter and early spring pasture, it may be worth many times the cost of seed and sowing. I shall watch it closely and report whether it is a success or failure.

I also sowed two bushels of winter oats as a trial, but being so far north—a little above latitude forty-one—I also sowed Crimson clover with some and mammoth clover and timothy with the rest; all did well, the oats making a magnificent growth and much relished by the stock. At present—March 9, 1897—seems all right yet. This oats and rye sown early make a good combination for fall, winter and spring pasture. I would add Crimson clover.

LIVE STOCK.

THE HORSE FOR THE FARMER.

BY J. MASON DUNCAN, CLOVERLAND.

[Read before the Clay County Farmers' Institute.]

After having spent several hundred dollars in trying to ascertain how to make horse-breeding profitable, I find myself with a barn full of "expectations," and consequently am rich in experience, if not in pocket. I am, therefore, forced through circumstances to give this topic thought and study, so that I may be better prepared to meet the future. Thus I have asked myself, What are the most profitable horses for the farmer to raise? This is not a new, nor is it an old topic. Yet it is one that should interest those who live upon the farm, those who hold the handles of the plow, to which are hitched man's most faithful companions, as it turns the soil which renders unto him and his the substance of life. I am well aware that there are those who believe that horse-rearing is a thing of the past; that electricity, horseless carriages and bicycles have or will supersede him. If this were true, it would indeed be a dark period in the life of the American farmer, and those that shall come after him; for the usefulness and function of the horse are essential elements of human happiness, and are indispensable to man, aye, to nations. The would-be horse killers will never live to see the day when the electric carriage, or the gasoline motor, with "its horrible smell," will take the place of the old family carriage, nor will it fill the wants of ostentation of wealth that demands a "coachman with a cockade; that means a coach, and the coach calls for a spanking pair." Horses, to go in heavy harness and before a victoria, landau, brougham, and other expensive and luxuriant vehicles that the wealthy demand, must not be ungainly individuals, but must have elegance, beauty and style—that beauty that wins friends and will keep them in the horse, as well as in other things. "Horses will grow in popularity and usefulness, and be as lasting as the Pyramids of Egypt."

Some six years ago horse-breeding was a remunerative business. Farmers could be heard saying: "Why should we raise sheep and hogs when there is such profit in horses; or why raise cattle when you can raise a horse as cheaply that will bring you twice as much?" Well, everybody went into business—the banker, the merchant, the clerk and the mechanic—each in hopes of being the one that would produce another \$100,000 horse. The standard bred horse was the cry. Then there came a time when the buyers did not equal the sellers; the bubble bursted; it proved to be an airy nothing. Cheap horses being thrown onto the market gave an impetus to an export demand; then hundreds went to the canning

factories "to be hermetically sealed, marked appropriately 'standard prime beef,' and displayed on the shelves of French, German and Italian shopkeepers." Thousands died from neglect and old age. Then there has been a stoppage in the breeding operations of at least 75 per cent, and it is beginning to dawn upon the average breeder of horses that in a few years hence there will be a shortage. Thus, with these facts staring us in the face, the cry of Richard III will be, "A kingdom for a horse," but not a horse to be had.

HORSE OF THE FUTURE.

The horse to be produced in the future must come from the better class of general farmers with good breeding stock; therefore, it is well at this stage of the game to ask of ourselves, What are the most profitable horses to raise? The market now demonstrates that the future which we as farmers and breeders must endeavor to cater to demands the right sort of goods, for which they are willing to pay, and in order to reach it we must breed not downward but upward. We must be impressed with this one idea, for if we can not convert those who have money to purchase horses with to our ideas then we as breeders must suit their fancy, unless we are in the business for our pleasure and not for the filthy lucre. Granting, then, that we are not in the business for our health but for the mighty dollar, what are the best horses to breed that will prove profitable winners? I am led to believe, from observation and study, that the draft horse for the general farmer is best. Your choice of breed will be all right, but be wise in selecting the individual. Now I do not say this because it expresses my own individual tastes; quite the contrary; but electricity has taken the place of the farmer's all-purpose horse, that can lay claim to no distinct breed, as a majority of them were bred without any particular object in view except to perform the work that usually falls to the lot of the farmer's horse. But in this day and generation the market does not recognize the so-called general purpose horse, as they are neither a road horse nor a coach horse, and are too light for draft purposes in cities; and for express purposes, fire departments and brewery wagons they have not the quick action, style and weight that are required, that money demands so that business may keep pace with the times. He who attempts to breed what is not wanted (the all-purpose horse) in ninety-nine cases out of a hundred will find it will prove a bitter disappointment. Then, in order for the farmer to suit the market, I repeat that he is more certain of it to breed the drafters, because the mares that he is supplied with are better suited for this cross. The breaking and handling of such horses does not require time and ability or the services of a professional trainer, special care of a groom, blacksmith bills, boots, blankets and other paraphernalia in the hope of making a sensational carriage team or landing a two-minute trotter. But, on the other hand, a farmer can break and fit his horses from their three-year-old to their five-year-old form in performing the work of the farm.

GENERAL PURPOSE HORSE.

Permit me to say here that he who has a hankering after the so-called general purpose horse will find that the offspring of a good active draft horse and a large, well-built mare will come nearer filling his idea, as such animals usually make magnificent individuals. I recall to mind seeing several years ago on the streets of Terre Haute such a team; their weight together was not less than 2,800 pounds; they were 16½ hands and moved out with snap. They were sold to go to Providence, R. I. I asked their breeding. Their dam was a half-blooded Percheron and their sire a registered Clydesdale. Taking this as an illustration, in beginning your operations select your blockiest and heaviest mares and, if possible, give "old Fan" a rest; do not breed her because she is worthless for anything else and will bring a colt that ought to be good, because she is a Morgan, or "one-eyed Dillie," because she has a supposed cross of Hambletonian. Pension the old girls off and do as the Scottish farmers do—select your young, vigorous fillies. "Men do not gather grapes from thorns nor figs from thistles." Take this as your motto and mate them with a horse that is strong in their deficiencies and with as many good points as it is possible to find, and do not let a dollar or two stand in your light. Seek for a horse of a superior class. If you have not such a horse in your neighborhood band yourselves together in a club and buy or hire one; my word for it: you will find it a profitable investment. My advice on the horse I would give in the same language that the elder Weller gave to his son Sammy: "I've done it once too often, Sammy; I've done it once too often; take example of your father, my boy, and be wery careful of widders." It behooves us as breeders to take example of our own past experience and be "wery" careful of the mongrel or plug.

COACH HORSE.

Of the other kind of horses that can be reared at a profit and which the market demands a fancy price, the first of these may be mentioned as the coach horse. But it is demanded of them that they shall be high goers, which means bold and free action fore and aft. In breeding for such horses the most essential thing is to have a high-trotting bred mare without a drop of draft blood, of weight not less than 1,100 pounds, having style, action, constitutional vigor, neck long and slim, and by all means not cat hammed; wide open nostrils. She should be mated with a horse possessing an intelligent head, refined muzzle, prominent eyes, good, expansive forehead, well arched neck that is carried erect, well arched loins, flat, deep quarters, tail well set up; he must be of a high gear, speed not required. All of which goes to make the ideal coach horse to horse the vehicles which people of social distinction demand and for which they are willing to pay, as appearances count for much with society people and it is essential that their horses should be attractive. They should be of a height of not less than 15.2 and not more than 16.2 hands, weight of from 1,200 to 1,450 pounds, and go at the rate of eight miles per hour. As a general thing they are used by the ladies of the family for shopping, calling, the theatre and parties. In large cities in attending parties, when it

draws near the hour of departure the coachmen form themselves into line with their equipages with horses champing at the bits; the footman of the house steps to the door and in a stentorian voice calls for the carriage of Mr. and Mrs. So-and-So, and of course the handsomest turnout always attracts the most attention.

Thus I have endeavored to show what you as a breeder must aim to reach if it is your desire to breed coach horses. Those who have foreseen this have made money even in these times, but this supply is beneath the demand and exporters are competing with home buyers. The Hackney is the breed that is most sought for, so fashion decrees, with the French coachers falling into line. But coachers can be found among the American trotters, namely, those sired by Harrison Chief, Manbrino King, and a few others.

The horse I would next mention is the combination horse, known as the Kentucky saddlers, which carry the riders with ease and grace. Their gaits are the walk-trot, fox-trot, canter and rack, and are changed by a slight touch of the hand or motion of the body. In my judgment these horses will be in great demand by those now riding the wheel for pleasure and who can afford to own a horse, as the wheel will prove but a fad after all, among the wealthier class, and will have its day. Thus the wheel will prove a blessing in disguise to the breeder of saddle horses in the future. The Denmark blood is noted for its saddle gaits.

At last I come to my favorite kind of a horse—the American roadster. I love them as I love none other. I love to get in behind an ambitious flyer; yes. I love to be among them.

“I love to hear the brood mares
In their stalls a-chewing hay;
I love to see them drinking
In their peaceful, quiet way;
I love to see the little colts
Trot down the lane and back
I like to see them later,
In their battles on the track.”

This kind of a horse to fill the fastidious tastes of gentlemen road riders must be an ideal horse, an intelligent brute, if you please, and be susceptible to education that appears almost human, for—

“Well handled he never shies,
He never runs away;
His heart is good at even time
Though you’ve traveled the livelong day.”

The Morgan is my ideal roadster, as he is endowed with good horse sense and is safe for the wife to drive. They will road from eight to twelve miles an hour. If you fail to get extreme speed you will surely get a handsome animal. As Gen. Bryant has so aptly said: “The Morgan horse put down the rebellion.” To use the words of Mr. Grattan:

“He confers distinction upon you; he yields you pleasure and satisfaction; he is not a blot upon the face of nature. Like a fine picture of sweet music he appeals to the artistic sentiments of your being. Skillfully managed he is like a grand instrument grandly played. The horse the Bible immortalizes in splendid imagery; Shakespeare, the incomparable, lifts him to the loftiest pedestal of poetic

grandeur. The greatest warriors of history—Alexander, Napoleon and Grant—worshipped him. Shall the horsemen of to-day continue to degrade him by breeding him in lines of ugliness? The thought is hateful, the practice is suicidal and following after false gods. The greatest profit, the speed and the greatest satisfaction are all allied to the highest type of beauty. Speed lines and lines of symmetrical contour run in the same channel. Abandon then, O readers, the lines of ugliness and swear allegiance to the beauty which is a joy forever."

THE FARMER'S HEN.

BY MRS. LAURA C. MANNING, ELKHART.

[Read before the Elkhart County Farmers' Institute.]

The feathered tribe has ever had its admirers, poets and scribes. Bryant sang of the unfaltering faith of the waterfowl; Burns praised the sweet contentment of the thrush; Coleridge created the albatros a bird of fame; Poe won his brightest laurels by his wonderful poem, "The Raven"; and among the sweetest of Alice Cary's poems is the one entitled "Robbing the Nest". To these might be added many others who have extolled the beauty and sweet songs of our native birds, but it remains for me to show forth in humble style, the virtues of the plain, every day hen.

Not the farmer's hen, however, for having exhausted encyclopedias and all available book knowledge in my search for that biped, I bethought me of the haunts of men. North and south, east and west, far and near, have I looked for the farmer's hen, but all in vain. There have been the hens of poultry fanciers, farmer's wife's hens, farmer's daughters' hens, farmer's mother's hens, even farmer's mothers-in-law's hen's, but no farmer's hens.

Once a vision of success gleamed across my pathway as I saw a big, well fed farmer and his wife enter the grocery with a basket of dressed chickens. After purchasing the weekly supply of groceries the farmer drew out a by no means empty pocketbook, into which went the balance of the chicken money. Desirous of information, the following conversation took place: "Are these this year's chickens?" "Yes, ma'am." "Did you raise them yourself?" "Oh, yes, I have fine young Plymouth Rocks." "I don't see how a man has time to do farm work and tend chickens too." "Oh, as to that, my wife tends the chickens." Then in response to an innocent look at the pocketbook, he added with a short laugh: "You see its on the principle of the boy's colt—the old woman's chickens and the old man's money." Thus my dream of success vanished into thin air and if you will excuse me, instead of airing my ignorance concerning the farmer's hen, your patience is besought in listening to the honors and beauties possessed by the farmer's wife's hen. She is a fowl of ancient lineage, dating from Noah's ark, but

she is not as some city customers declare that original bird, for no hen has ever been known to live that long. However, she might be a granddaughter.

She has many points of excellence, not the least of which is her breeding a choice mixture of the following varieties: Leghorn, Shanghai, Cochin, Plymouth Rock, Hamburg, Game, Black Spanish, and, to quote that well known author, Sale Bill, "others too numerous to mention."

She combines all the good qualities of her ancestors, producing a hen, which, for flying a fence, scratching a garden bed, fighting her mistress, persistence in setting and faithfulness in laying can not be surpassed.

The hen belongs to the order Gallus bankiva. She is generally supposed to have come from India, but the original stock has been so modified by cultivation for thousands of years that it can not be identified. She is a faithful creature in the performance of her work as dooryard scavenger; not an available morsel escapes her keen watchful eye and no particles of food are left in her province to become a source of offense to the senses of mankind.

She is a marvel of patience at the setting season, and always a model for early rising, being a firm believer in the old adage that "the early bird catches the worm."

Her cheerful morning song tells of a pleasant disposition and a contented mind, not burdened by distracting cares and high ambitions. Indeed, she has only one high ambition and that is only as high as the top of the fence which separates her from the fertile soil of newly planted fields or garden beds.

To speak truly, this o'er-weening ambition of hers is her most serious fault, and however bright her virtues it can not be overlooked. By it, with the great Wolsey, she could sometimes say, as she stood on the garden fence, "I've touched the highest point of all my greatness, and from that full meridian of my glory I haste now to my setting. I shall fall like a bright exhalation in the evening and no man see me more." And thus, frequently, she lays down her life for her ambition. Not unlike mankind is she in this, following in the footsteps of so great a leader as a Caesar or a Napoleon.

She is possessed of a graceful dignity of manner that is seldom disturbed. If, as Holmes says, "Nothing is so vulgar as to be in a hurry," she is extremely well bred and genteel. Her bearing, while reasonably friendly, does not invite familiarity. She is shy of strangers, but will yield to kindness, even to discommoding herself, to accommodate her friends, as did a hen last spring. She slipped into the open kitchen door and was discovered laying in the egg basket on the lowest pantry shelf. She attends to her household duties in a quiet, orderly manner, with an occasional relief to her feelings in the shape of a loud, joyous, prolonged cackle. From the noise she makes, a stranger to her ways might imagine she had laid the fabled golden egg, but investigation proves that it was not the golden one, nor its political rival, 16 to 1. However, it's the egg that helps to bring in the coppers and fill the larder with the necessities of life. Tea from China, spices from Borneo, coffee from Brazil, and sugar from the West Indies are a part of her foreign commerce, not to mention the domestic exchange for boots and shoes, dry goods and millinery.

She should be a *lav* member of all church societies, for she not only helps to feed the preacher, but she helps to pay him by her contributions to the egg basket.

She is an independent creature and believes in paying her way as she goes, unless she is spoiled by over-indulgence and much petting. Another resemblance to the human family may here be observed. A person surrounded always by the ease and luxuries of life, without heed to their source, is not likely to develop into as useful, independent a character as if, like a paying hen, he was obliged to scratch in part for a living.

Many years of observation reveals the fact that the college student, who works his way through college, wholly or in part, is generally found, in after life, far in advance, mentally, morally and physically, of the rich man's son, who finds an ample allowance all too small for his demands.

Not that there is much danger of an eighteen cents-a-bushel corn raiser's boy being too abundantly supplied with money, but the fact that he is not so supplied need not deter him from securing a college education with most satisfactory results.

As to how well a hen pays her way, any reliable poultry magazine or your own individual experience will tell you. My own private opinion is that hens on a farm do not pay as well as they would if they were properly fed and housed—but that's the fault of the owner, not the hen, who is a creature of circumstances. It is not the purpose of this paper to give any rules and regulations for the care of hens, as many of my good theories have never been put in practice, and my hens are, in their laying and setting, a little like a good wife's disposition :

" When she will, she will,
You may depend on't;
When she won't, she won't,
That'll be the end on't."

The mother hen rules by love, but so skillfully and easily that her family government might be taken as a model in many human households. Her maternal love transforms her from the proverbial chicken-hearted creature into the most fearless fighter. She will attack any enemy, however superior in size; she will brave any danger in behalf of her young. With her little brood under her wings, she constitutes herself their shelter and defense.

Our own dear Master drew many beautiful lessons from Nature, from the filmy cloud, the barren fig tree, the bleating sheep on the rocky hillside, even the tiny mustard seed. But He illustrated most forcibly His own tender, faithful love to all mankind, not only in that wonderful verse, "Jesus wept," but in His earnest, heartfelt cry, "O Jerusalem, Jerusalem! how often would I have gathered thy children together as a hen gathereth her chickens under her wing and ye would not."

Not only as a mother is she a faithful provider, but as a servant she dispenses to the household a very necessary ingredient to a variety of delicious dishes—as omelets, cakes, puddings, sauces, custards, salads, chicken pie, etc., etc. Indeed, the emotions aroused within me—and especially at this hour of the day—at the thought of all the delicacies for which we are indebted to the hen can not be

expressed in plain, every-day prose, but seeks the poetic level of a Tennyson, a Longfellow or a Whittier.

They may sing of the sweetness
Of the nightingale's note ;
They may praise the curved neatness
Of the swan's glossy throat.
They may shout the wild glory
Of the eagle's swift flight ;
They may tell in strange story
Of the ostrich's great might.
But the bird that appeals to common men,
Roast, stewed or fried, is the farmer's wife's hen.

SWINE RAISING.

BY LEWIS DE VILBISS, BLOOMFIELD.

[Read before the Greene County Farmers' Institute.]

If this indispensable animal were taken from our farms, a blank would be made that nothing else could fill.

Swine have many peculiarities which are styled pure cussedness by those who do not admire their industrious habits. They have an energetic way of investigating things about the farm. There is nothing more worthless and despicable than a starved hog, especially if a female one that has a family of her own to maintain. There is nothing that will escape her notice. She hunts all the gaps left open on the place, subsoils the newly set grass, possibly looks after the corn that has just been planted ; it may be the truck patch ; she gives it the finishing touch. That way of raising swine is a curse ; the owner that compels them to make their own living the meaner of the two.

These instinctive peculiarities are blessings in disguise, when turned to their proper use by the intelligent breeder.

The pig has an almost insatiable appetite that must be gratified. It never pays to starve him. He is frequently styled the mortgage lifter, and, if properly cared for, will do more to remove that incumbrance off of the home, than any other animal raised on the farm.

The question arises, How shall we raise swine at a profit? First the farm must have some natural advantages, or raising of swine to any great extent will be a failure. Plenty of good water is positively necessary. Good pastures of grass or clover. Land that will raise good corn will raise good clover. Corn, clover and hogs are very closely allied to each other. If a man can't make clover and hogs pay, he has missed his calling. You must not let your sows have their pigs at all times of the year in fence corners, brush piles, old straw stacks, or you will soon be at the end of your row. It is best to select some particular breed, the one that suits your ideal. There are a number of good breeds, so that one can

hardly run amiss, but if you get your ideal, you are apt to take better care of them. There is nothing like good care in raising swine. You should study the different characteristics of the breed you choose, so you can mate your hogs in such a way that the produce of your herd will be uniform in color, markings or size, and have desirable similarity. Cross breeding makes good feeders, but they do not, as a rule, look so well in a herd. Inbreeding should never be practiced by the ordinary breeder. The fancy breeder can do this to a certain extent. Haphazard inbreeding invites disease. Sows that are somewhat rangy usually are more prolific and better sucklers than more blocky ones, but not always so. Sows should be as much as eight months old before being bred.

The male should be as much as eight months old and should be the ideal hog you are breeding for. If you are raising pure bred stock and expect to raise high scoring individuals, the sow should be the same make-up of the male, selecting her from ancestry that are prolific breeders and good sucklers. The male should on no account be allowed to run with the herd.

The best results at farrowing are generally obtained by mating matured sows with vigorous young males. The best months in which to have pigs farrowed are February and March. April is good, and, probably, where a large number of sows are bred, would be the best to have them in this month. The weather is usually better; they need less attention, which is indispensable to success in cold weather. August and September are the best fall months; they get to a fair size before cold weather and are ready to put on the market in early summer. Fall pigs often do not pay for the feed consumed.

The pig that always pays grows between two winters. The spring pig lives on the nourishment furnished by the dam until warm weather, then it can roam over the blue grass and clover pastures and by proper supplemental feeding will be a fine fellow long before winter.

So rapid is the growth of the improved breeds that the larger part of the hogs put on the market between October first and the first of April were never listed for taxes. In fact they were not in existence at the time.

Brood sows should have good care during the time they carry their young. A variety of food is necessary for best results. Best not to have them extremely fat, but a sow in good flesh gives more and better milk, and is not likely to be in a condition to eat her pigs. It is not best to have too many sows sleep together near farrowing time. A record of her service should be kept and a few days before farrowing she should be put in a good shelter by herself.

Sows should be made gentle so they can be handled at farrowing; whole litters can be saved that otherwise would be lost. The sow, after she has her brood, should be given drink—water that is not too cold—with a little bran or ship stuff stirred in, but not much food for the first twelve hours, gradually increasing for about ten days. If you feed too high, too rich food, it will scour the pigs. After the pigs are old enough to commence eating, they should have a place partitioned off so they can eat to themselves. Feed them soaked shelled corn, milk, millfeed, a variety of feed; an occasional feed of oats to the sow will be very beneficial to the pigs in growth of bone and muscle.

Swine should always have plenty of salt mixed with wood ashes. Air-slacked lime scattered on the feeding floors is good; it prevents them, to some extent, from getting off from their feed. When swine are being finished for market, and fed exclusively corn, they should be pushed as fast as possible, by feeding all they will eat up clean from one feeding time to the next. Swine are more liable to disease when fed exclusively on corn, and all they will eat, than any other time. A thin slop made of ground wheat, or wheat and oats, ship stuff, or bran, is most excellent; they will consume an additional amount of corn, and the gain will be greater in proportion to the amount of food consumed, than if given corn and water, and more likely to keep healthy.

Keep your hogs well scattered in small bunches, keeping large hogs and small ones separate as much as possible.

What has been read is not all, but only a few of the essentials in the raising of swine.

SHEEP HUSBANDRY.

BY CHARLES ZEIS, NOBLESVILLE.

[Read before the Hamilton County Farmers' Institute.]

The first and most important part of sheep husbandry is to have a love for the work and to have energy and ambition enough to attend to the small details of the work and, if need be, get out of bed at the midnight hour to go out and see after the flock. If a person has these qualities, in my opinion, he will make a fair shepherd; but, if not in possession of these gifts of nature, he had better leave the work alone, for as sure as he tries the work and fails he will condemn the industry and try and discourage some one else that would make a success of it if he undertook the work.

I know in the last few years a great many flock masters have disposed of their flocks, claiming that it did not pay; that they got nothing for their wool and lost nearly all of their lambs and only got a few cents for those they had left.

I go over the country some and see how some men take care of their flocks. I have even seen little lambs only a few hours old out in the field with the thermometer at zero, and almost frozen. I didn't stop to see where the owner was, but supposed the poor fellow was sitting by the stove and his good wife was carrying in wood and keeping up the fires to keep the would-be shepherd from freezing. I want to picture to you how some men carry on the work. I imagine I see this poor fellow go out about sundown to see after his lambs. I think this will be about his conversation all to himself, for I don't think he would want to talk to any one else after he finds what has happened on account of his carelessness.

All at once, to his surprise, he sees a lamb, comes a little closer; yes sir, two of them, and finds both dead. Now his profit with that ewe is gone and his manner of speech changes to a different nature:

"Confound that old ewe! I thought she would have more sense than to come way out here in the field to have her lamb; if she would have only bleated my wife would have went out and put her in the stable. I had no idea it was cold enough to freeze a little lamb. Of course, I didn't go out this morning; the boys did the chores before they went to school. Look over there; if there isn't another one; that devilish old sow has got that one. Now, if that don't beat the old boy himself; just wish I had a gun here; I would give her something better than frozen lamb."

Now this man talks of quitting the business:

"Well, sir, I am just going to quit the business; it don't pay. Last year I only got 8 cents a pound for my wool; it was all full of burs and fleece-grown and dirty; nobody seemed to want it. Finally, though, I squeezed 8 cents out of Charlie Johnson. Then I believe he cheated me; with all the tags in, the fleeces only averaged 9 pounds.

"Then there was the lambs. I only got 2½ cents a pound for them, but then I beat Sam Craig on them. He gave one dollar and a quarter to bring them to town and 2½ cents a pound and he only got 2½ cents a pound at Buffalo.

"Then there is that notorious Wilson bill. When that took effect I didn't have the cheek to look my sheep in the face. When I sheared I stood them on their heads and commenced at the tail and sheered the other way."

NOW TO SUM UP.

He congratulates himself because the wool buyer didn't make anything out of the wool, and the shipper lost money on the lambs, and where the Wilson bill took off the duty he put on the tags; quite a schemer; beat himself all the way through and in the wind up beat the dealers. My verdict on such men would be to make them stand on their heads with their coat tails over their shoulders so you couldn't see them in the face and the President of the Humane Society take a good two-foot paddle and warm their pants until they smoke. This is, I believe, a fair sample of the reasons why some men quit the business. Who is to blame, the man or the sheep? I will leave that for you to decide.

Every successful business man has a rule or system which he aims to carry out and which he must if he wants to prove a success.

So it should be with the flock master. Experience has taught me some things which I will try to give: First, as I have stated, you must have ambition and energy enough about you to give the work a little special attention. Second, use good judgment in selecting and improving your flock. If you have a good lot of ewes and a poor male then half of your flock is poor as far as breeding is concerned; the male is half the flock. So you can see at once the importance of selecting a good male.

Never breed any of either sex under eighteen months old. I would rather have a male from three to five years old than younger.

Select a male that has a nice neat head and ear, with a strong, firm step or carriage; straight from his shoulders to his rump; see that his neck is full and

that he carries his head higher than his shoulders. He should be well proportioned both in hams and shoulders; should not weigh less than 180 or 200 pounds when in good flesh. Select a ewe of about the same description, only she need not be so large, and of either kind I always like to have a good large wide body. I find that a ewe with a small round body, as a general thing, is a poor breeder.

The best time to make selection of your own flock to improve it is when the lambs are a few days old. Notice the ewe and lamb both. If they are good mark the lamb. If the lamb is good and ewe not don't mark the lamb. Mark all the good ones from good mothers. Then in the fall at weaning time if you have marked more than you want to keep select the best of these and fatten the balance. If you want to keep a certain number throw out as many of your poorest ewes as you keep of the best lambs.

WHEN TO BREED.

I always commence breeding on the 25th of November. A ewe will be in lamb 148 days, the shortest period, 156 the longest, the average time is 152 days; this will bring my ewes due to lamb on the 25th of March. Some say, "Why not breed earlier?" That will do if you haven't got too many sheep and have a good warm stable. With fifty or sixty ewes I would rather have the lambs come later and save 90 per cent. of them, as to have them come earlier and run the risk of losing half of them.

CARE OF EWES AND LAMBS AT LAMBING TIME.

Provide a good, warm stable, with plenty of ventilation. At this time I separate my ewes in two different lots, putting in a close place so they can be handled without any danger; don't frighten your sheep at this time. In catching take a firm hold around the neck or in the flank and don't let them struggle. For my sheep barn I have four different stables. In the middle stable I make some five or six small pens and have at hand a pair of shears, a bottle and rubber and several pieces of old blankets. On finding the lambs I put them in these small places or stalls for a few days until they get some strength, then they go back in a fourth stable off to the north of the three; so I keep on until they have about all gone through this mode of handling.

After the ewe has found her lamb see that she is properly cleaned by taking the shears and removing all tags and shear away from around her udder so that the lamb has a fair chance to nurse. Notice that she has milk for her young and that the milk passages are not closed up. You will often find this to be the case that the milk passage is closed by a scum or wax being formed over it. See that your lamb goes to nursing; if it doesn't, get your bottle and rubber and make him drink but only a little at first. If you should have to raise by hand with cow's milk be careful that milk and bottle are both pure and sweet at all times. At this time for two or three weeks I don't aim to do anything else, only take care of my ewes and lambs. At the time my lambs are about a week old I castrate and dock them. Those that I want to keep I dock close, the balance not so close.

Now is the time I commence taming my sheep. When I am around with them I often catch the little lambs to pet them and play with them. I often spend a half hour in playing with the little lambs; they will soon learn that you delight in them. There is nothing that is of more advantage with a flock of sheep than to have them tame. The only disadvantage I find is that sometimes the old boss sheep might use his business end on you, but if he does, that will only give you a keen conception of the business. I commence graining my ewes about six weeks before they are due to lamb, beginning with about a pint of oats a day, gradually increasing until I give three pints a day. If I have good clover hay I don't give quite so much; give plenty of water and let them have free access to salt and ashes at all times.

Let them have an hour or so of exercise every day in some field; it will do them good. If there is not much to eat, turn them out anyhow; the exercise is what they want.

CARE OF LAMBS AT WEANING TIME.

About the last of August or first of September I separate my sheep by putting all the males in one field, the ewes in another and the lambs in the best pasture I've got, keeping them as far from the ewes as I can. With my lambs I always put one or two old ones for a leader. After weaning I most always feed my lambs oats for about four weeks. This will bring us up to October. By that time the grub fly has about fulfilled his mission, so that the lambs will do very well without grain if you have good pasture.

WHEN TO FEED AND SELL.

The first is easy enough to answer, the latter is more difficult. I will give my way, then you can decide whether you think there is anything in it or not. About the first of November I close my lambs in small lots by putting about thirty in each place. In dividing them I first select the smaller ones for one lot, the medium sized for another and the larger ones alone. This way the smaller ones have as good a chance as the larger ones. I am now ready to commence feeding. I commence with about one-half pint of corn at a meal night and morning. I keep on with this feed until they all take to eating. Sometimes it takes two weeks or more to get them to eat right. Then I commence increasing my feed until I get to two or three pints a day, owing to the size of the lambs. Give all the rough feed they will eat, such as hay and fodder. Water once a day will do very well, twice would be better. Give them access to salt and ashes all the time. I aim to have them fat in two months. Then if the price suits, I sell; if not, I sometimes feed two months more. A good lamb ought to gain ten pounds a month.

Last year the lambs of my own raising averaged 120 pounds; those I bought averaged 112 pounds. They made a gain of thirty pounds in about ninety days' feeding. By averaging the lambs I kept with those I fattened my ewes averaged me not quite \$7.50 each. I have one ewe that in the last three years has made me, by averaging the lambs with the rest, about \$40. She had nine lambs in three years and raised eight of them.

Never buy a run down lamb or sheep to fatten. There is something wrong. If they are poor on account of something to eat it is all right to buy them.

WHEN TO SELL.

This question is hard for me to answer for you. I don't know how much feed you have, what kind of shelter you have and how hard you are up for money. I never sell until after the holidays. Once in awhile I don't make much by feeding this late, but year after year I find it pays me. This question you will have to decide for yourself.

LIFE ON THE FARM—FARM LIFE.

BY J. D. SELBY, PETERSBURG.

[Read before the Pike County Farmers' Institute.]

Men and women were created for business, for activity, for employment. Activity is the life of us all. To do something useful is the duty of life. Employment makes the man in a great measure. A man with no employment, nothing to do, is scarcely a man. The secret of making men is to put them to work, and keep them at it. It is not study, not instruction, not careful moral training, not good parents, not good society, that makes men. These are means of making men, but back of these lies the grand molding influence of men's life—and that is employment. A man's business does more to make him than everything else. It hardens his muscles, strenghtens his body, quickens his blood, sharpens his mind, corrects his judgment, wakes up his inventive genius, puts his wits to work, starts him on the race of life, arouses his ambition, makes him feel that he is a man and must fill a man's shoes, do a man's work, bear a man's part in life, and show himself a man in that part. No man feels himself a man who is not doing a man's business. A man without employment is not a man. He does not prove by his works that he is a man. He can not act a man's part. A hundred and fifty pounds of bone and muscle do not make a man. A good cranium full of brains is not a man. The bone and muscle and brain must know how to act a man's part, do a man's work, think a man's thoughts, mark out a man's path, and bear a man's weight of character and duty before they constitute a man. A statue, if well dressed, may appear to be a man; so may a human being. But to be a man and to appear to be are two very different things. Human beings grow, but men are made. The being that grows to the stature of a man is not a man till he is made one. The grand instrumentality of man making, then, is employment. The world has long since learned that men can not be made without employment. Hence it sets its boys to work; gives them trades, callings, professions; puts the instruments of man making into their hands and tells them to work out their manhood. And the most of them do it in some way. The men who fail to make for

themselves a respectable manhood are the boys who are put to no business, the young men who have nothing to do. The beings who have no employment. Our men of wealth and character, of worth and power, have early been put to some useful employment. Many of them were unfortunate orphan boys, whom want compelled to work for bread. In their early boyhood they buckled on the armor of labor, took upon their little shoulders heavy burdens, assumed responsibilities, met fierce circumstances, contended with sharp opposition, chose the most rugged paths of employment, because they yielded the best remuneration, and braved the storms of toil till they won great victories for themselves and stood before the world in the beauty and majesty of noble manhood. This is the way men are made. There is no other way. Their powers are developed in the field of employment. Our great and good men that stand along the paths of history bright and shining lights are witnesses of these truths. They stand there as everlasting pleaders for employment. Agriculture then, is the greatest and most pleasant of all the employments of this life. It is the first in supplying our necessities. It is the mother and nurse of all other employments. It favors and strengthens population; it creates and maintains manufactures; it gives employment to navigation and materials to commerce. It animates every other employment. It is also the strongest bond of well regulated society, the surest basis of internal peace and the natural associate of good morals. We ought to count among the benefits of agriculture the charm which the practice of it communicates to a country life. That charm which has made the country in our own view the retreat of the hero, the asylum of the sage, and the temple of the historic muse. The strong desire, the longing after the country with which we find the bulk of mankind to be penetrated points to it as the chosen abode of sublimary bliss. The occupation of agriculture, with her varied products and attendant enjoyments are, at least, a relief from the stifling atmosphere of the city. Health, the first and best of all the blessings of life, is best preserved by the practice of agriculture. That state of well-being which we feel and can not define; that self-satisfied disposition which depends, perhaps, on the perfect equilibrium and easy play of vital forces, turns the slightest acts to pleasure and makes every exertion of our faculties a source of enjoyment. This inestimable state of our bodily functions is most vigorous in the country, and if lost elsewhere, it is in the country we expect to recover it. We deplore the disposition of young men to get away from their farm homes to our large cities, where they are subject to difficulties and temptations which but too often they fail to overcome. We have observed the growing tendency of young men, yet early in their teens, to abandon the healthful and ennobling cares of the farm for the dangerous excitements and vicissitudes of city life and trade. Delightful firesides and friendly circles in the quiet rural districts are every day sacrificed to this lamentable mania of the times. Young men, favored with every comfort of life, and not overworked, fancy they may do better than to guide the plow, and with the merest trifle of consideration their hands are withdrawn from the implements of agriculture and given to the office or shop work of the city, which generally proves vastly less agreeable or profitable than they had anticipated. Disappointed, they fall under the advance of mischance that comes so swiftly of foot, and where one is enabled to withstand the sweeping tide of temptation, five are submerged in it.

angry waves and are hurried on to ruin. Every year finds hundreds of such victims allied to the fallen and vicious of every class, who would have been saved but for the desertion of the farm, the home, and true friends. It has been well said that for a young man of unstable habits there is no place where he will be so soon ruined as in a large city. Parents throughout the country have not failed to realize this startling truth, and to sorely mourn the strange inclination of their sons to encounter the fascinating snares and pitfalls of city residence and fashion. Let the country lad be as well educated for the farm as his city cousin is for the bar or the counting room. And by all possible means let the farmer be led to properly estimate his high and honorable position in the community. "Ever remember," writes Goldthwait, "that for health and substantial wealth, for rare opportunities, for self-improvement, for long life, for real happiness and independence, farming is the best business in the world." History tells us of one who was called from the plow to the palace, from the farm to the forum; and when he had silenced the angry tumults of a State, resumed again the quiet duties of a husbandman. Of whose resting place did Halleck write these beautiful lines?

Such graves as his are pilgrim shrines,
Shrines to no code or creed confined,
The Delphian vales, the Palestines,
The Meccas of the mind.

It was Burns, the plowboy, afterward the national bard of Scotland. Burns, himself, has left evidence that he composed some of his rarest gems of poetry while engaged in rural pursuits. It would require volumes to enumerate the noble men who have recorded their appreciation of farm life and enterprise. Every age has swelled the illustrious number. Our own immortal Washington was ever more enamored of the sickle than the sword, and unhesitatingly pronounced agriculture the most healthy, the most useful and the most noble employment of man. When we walk out into the broad fields of nature we go not as artists to study her scenes, but as her children to rejoice in her beauty. The breath of the air, the blue of the unclouded sky, the shining sun and the green softness of the unflowered turf beneath our feet, are all that we require to make us feel that we are transposed into new life and a region of delight. We breathe and tread in a pure and untroubled world, and the fresh, clear delight that breathes round our senses seems to bathe our spirits in the innocence of nature. It is not that we have prized a solitude which secludes us from the world of life, but the aspects on which we look breathe a spirit, the characters we read speak a language which, mysterious and intelligible as they are, draw us on with an eager and undefined desire. In shapes and sounds of fear; in naked crags, gulfs, precipices, torrents that have rage without beauty, desolate places—all speak in some way to the spirit and raise up in it new and hidden emotion, which, even when mingled with pain, it is glad to feel. Of all occupations, that of agriculture is best calculated to induce love of country, and rivet it firmly on the heart. No employment is more honorable, none as conducive to health, peace, tranquility and happiness. More independent than any other calling, it is calculated to produce a love of liberty. The farmer stands upon a lofty eminence and looks upon the bustle of cities, the intricacies of mechanism, the

din of commerce, with feelings of personal freedom peculiarly his own. He delights in the prosperity of the city as his market place, acknowledges the usefulness of the mechanic, admires the enterprise of the commercial man, and rejoices in the benefits that flow from the untiring investigations and developments of science; then turns his thoughts to the quiet of his domain and covets not the fame that accumulates around the other professions.

THE BRIGHT SIDE OF FARM LIFE.

BY BERTHA MACKLIN, GENEVA.

[This paper was read before the Adams County Farmers' Institute.]

Just as sure as night cometh day dawneth, and as sure as the clouds darken the sky the sun shines, and as sure there is a dark and a discouraging side of farm life there is also a bright side.

The bright side of farm life, or a part of it, is when the farmer will get up in the morning in time to hear the chickens crow, and when he is on his way to his field of labor the birds will sing as if they are welcoming him back to his work and he can look over his farm and see the golden harvest fields and the green waving corn waving as the ocean before him and when winter comes he can sit by his bright blazing fireside with the happy thought that he has raised a good crop and his granaries are well full.

But so many can not see the silver lining; they will grumble of too much rainfall, or else not enough; of poor markets, low prices or slow sales. They can borrow more trouble than some people can borrow money. They will say, "Oh! I am afraid we will have poor crops this year; I will just tell you, sir, my wheat looks bad; my cows are so poor I am afraid I will not realize enough profit to pay for their feed;" and so they continue to grumble.

They are like the little boy whose mother had given him a piece of bread and butter. He took it and curled his lips, but did not eat. "What is the matter with your piece, my son; don't you like that bread?" "Yes, the bread is all right." "Well, then, don't you like that butter?" "Yes, the butter is all right." "Well, then what can possibly ail your piece, my son?" "Well, mother," says the boy, "I don't like the way the blame thing is spread." So many can not see the "bright side" because they don't look for it. They don't like the way the old globe is spread.

Happy is the farmer who comes from the field with toil-worn hands and heated brow, who finds a refreshment, neatly spread, awaiting him, a kind word and harmony in his family that create sweeter music in his soul than all the grand instruments that wealth can buy.

Happy and cheerful is the farmer's wife who finds that he who vowed to love and protect her has kept his sacred word. How thankful should the children be

who can say, we have kind parents, we have a family altar and we have a happy home. Although the floors may be uncarpeted, no pictures adorn the wall, such a home will leave a deeper imprint in their hearts and a greener spot in their memory than a home furnished with the wealthiest surroundings where there is turmoil and family trouble.

Some of the happiest people are the poorest; they are constantly finding flowers in their pathway, comfort for their sorrow and a refuge for their trouble.

Oh! how sweet and peaceful is the home where children are kind and obedient to their parents, and parents are kind to their children; but numberless are the homes to-day upon the face of this earth that are blighted with the disobedience of children and the unkindness of parents. Why can't we, as a free American people, find more sunshine, less cause for grumbling, more happiness, less contention for wealth, more love for each other and more happy homes? What constitutes a happy home? Is it wealth, grandeur, honor or fame? Oh no! my dear friends; it is health, contentment, kindness, cheerfulness, hope and blessed assurance that your peace is made with God. The one who enjoys the sunshine of such blessings every hour of his life is a golden opportunity.

POSSIBILITIES OF FARM LIFE.

BY MRS. MARGARET M. BRONSON, FARMERSBURG.

[Read before the Sullivan County Farmers' Institute.]

Mr. Chairman, Ladies and Gentlemen:

My subject properly deals with the intellectual development of the farmer's family. I shall not attempt to exhaust the subject, but merely speak of some of the adverse conditions and of the favoring circumstances, and how to profit by them. And allow me to say that I do not wish to treat with levity those noble women who have stood side by side with their husbands in the past while the trees were being cut down and the forests cleared to make room for this great commonwealth of Indiana, but rather hope that their mantle of energy shall descend upon our shoulders, to make us worthy of such an ancestry.

While we have met to discuss a more profitable manner of farming, by the use of time and labor-saving machinery, utilizing the odds and ends about the farm that in the past were wasted, and by this means filling the coffers of the farmer, we wish to find in what manner these conditions ought to affect the farmer's home and family. With the riding plows, self-binders, steam threshers, roller process in milling and steam baking, we are supplied with the staff of life; and if we add creamery butter, we have a gold headed cane and are rid of two troublesome elements in housekeeping—the baking of bread and churning of butter. And in the same way other domestic employments will be delegated into other channels, and the housekeeper finds time for that higher development which every woman

needs. We wish to speak more especially of the intellectual development of the women in small towns, and especially those upon the farm. The men go to the store, postoffice, barber shop, read the papers, discuss current topics, and will be in a measure informed; but the women, in many cases, must be contented with neighborhood news. The women, in many places, are taking the lead in moral, intellectual, religious and philanthropical questions, and the reform will reach us before we are aware; so we may as well prepare ourselves by reading up. It is an undeniable fact that none of us get the best we might out of life, and this we learn oftentimes too late to profit by the knowledge, and most of all the farmer's wife, and that, too, when they are so abundantly blessed with that which is conducive to a higher plane of living, namely, pure air, wholesome food, isolation and a mind free from business pressure. Although with these favoring conditions there are yet obstacles to be removed, but it will take only a willing mind, time, and a small amount of money. With pure air and wholesome food, the physical conditions are favorable. As to isolation, sages or philosophers in all ages have sought solitude in which to meditate. Contact with our fellow creatures sharpens wit, but wit is surface faculty, and "silence is the soil in which thought grows," so that we may read a little, and as we go about our work in quietness we are enabled to assimilate what we read, while in town we are liable to interruptions by calls from our close neighbors.

Upon the farm we are sure to get a living if we work, and the work is there for us if we want it, as certain as the seasons change, and the industry grows into a living for us while we rest or during sickness, while in the city a man's salary stops during sickness or in a time of business depression, and in many cases every day uses up its own wages, and the mind is liable to dread the future. But the farmer is a king among men; prices may run low, and some crops fail, but he has still enough left to insure a full larder.

Now comes a question of time, which with the wife and grown daughters at certain portions of the year is an important one. The husband thinks it to be a wonderful crowding of work if the harvest comes on before the corn is laid by, but the wife has house cleaning, and often a rag carpet to prepare for the loom, soap to boil, poultry raising, spring calves to wean, garden to make, meat to smoke, meals to prepare for the hands and family, and if we add to these the spring sewing, we have an array that well might tax the ingenuity of a colossal brain and not leave room for much else. Consequently if we want time for any other purpose we must diminish our list by leaving out some of them.

As this is happily a not abiding condition throughout the year, there is still time if we are willing to use it properly; but in a false notion that we are thrifty we have knitting, patch work, quilts and rag balls to make; and the greatest waste of time and energy is patch work, as it is not taken up as a pastime, but becomes a mania. The women who make these are natural poets, artists, mathematicians and architects. Some of the names prove the presence of the poetical faculty, such as "Doves at the Window," "Rising Sun" and "Ocean Wave." A friend made me one of the last named; it was a "mathematical absurdity," a symphony in rags; she tried to show me how to put it together; I would rather undertake a problem in "Euclid," so I offered to let her arrange it for me, which she did, and I

am certain she is able for better things. Of course, these balls of carpet rags and stacks of quilts bear evidence to a woman's thrift, and "to all well regulated minds economy is a pleasing virtue. But in what shall we economize? Vitality? intelligence? or scraps of calico or bits of rags? Woman's labor was lightened when the spinning wheel left, but the sewing machine is a worse time destroyer if we ruffle and tuck and continually make over. A young girl spinning might be artistic, but one humped over the sewing machine is quite the reverse. I mean to use it as a lightener of labor; don't sew all the time; buy more things ready made, and by this means let others find employment. This is benevolence. Also take the knitting to some poor woman who needs the work. Fancy work should be treated in the same manner. You say you want something to do when you visit. You have no time to visit except as the men do. They don't keep their hands and brains busy about frivolous things. Let us follow this mode, and when we rest let us rest. The closer we follow them in business plans the better. We can not afford to be knitted, carpet ragged, quilt patched or crocheted into a bundle of nerves and wrinkles, nor can we afford to leave so many good things out of our lives; as well might our husbands use the old-fashioned plows or other obsolete machinery as for us to follow in the footsteps of our grandmothers. If we might do without this culture for ourselves, we ought for our children's sake to read and learn to enjoy some of the masterpieces of literature. These are read in the schools, but in many cases to not much purpose, as many of the teachers, being young, do not know much more than we do. They have a formula to get the central thought and purpose, but whether by this plan children can be taught to appreciate the beauties of a selection is a question in my mind; but from a mother's lips they would always be beautiful. Then for the sake of our children, at least, let us read. What? how? and when? For one thing, the Bible; not chapter after chapter, just to say we have read it, nor for doctrine or controversy, but for history, romance, poetry, philosophy, eloquence and christianity. Many of the different religious denominations furnish excellent outlines by which to study the Bible. The children's library books furnish good reading. The mother ought to read every book her children do, and by this means be able to advise them as to the book's fitness to be read. These library books include stories from the history of different nations, about plant and animal life, and are very instructive. I never regret one year that I had access to a child's library, and read the books with profit, such as Lamb's "Tales from Shakespeare," stories from the mythology of Egypt, Greece and Rome, the Oliver Optic Series, and many others. But a mixed feast of this kind is liable to have in it many things that do not assimilate and make good brain food, so we may read less and be profited more. One dollar per year will furnish us with the "Ladies' Home Journal." I know of no other publication where you get such a variety of thoroughly good reading for so small an amount of money. Mr Moody, as you are all aware, conducts a national Bible class by means of its columns. Although I would not advise you to give much attention to dress, still every farmer's wife ought to take the "Delineator;" as apart from its pattern and dressmaking departments there is some excellent reading. With these two, which cost only \$2 per year, you will do very well for magazine reading. And let us not meddle with the so-called "hysterical novel" of the

Augusta J. Evans school, but if we read fiction, let it be of the best class—"Pansy," Miss Alcott, Dickens, Thackeray, George Eliot, Cable, the younger James or W. D. Howells. It is a foregone conclusion that we have the "Indiana Farmer" in the family, and that the women do not have to save up the money to pay for it. Next, how shall we read? If you can not tell what you read, it is time mispent; if you have small children in the family, then you may strengthen their memory by telling to them many things that you have read, modified to suit their understanding. You will also need to go back to childhood in your own life for stories and little songs, and a great blessing are little children, as they were to me during my seven years of farm life in Sullivan County. They kept alive all the poetry and romance that otherwise might have died easy. We had so much better chance out upon the farm to read and study than we have in town; the best room in the house, with its books and music, was well warmed and ready after milking, feeding and an early supper, for a long evening in which to read and sing; now they are all out and gone, or we have company, which often introduces an entirely different element, and we regret many times that we ever left the farm.

There ought in every country neighborhood to be a literary circle composed of ladies entirely, as the men, if they are in a society, are allowed to monopolize the time and have up for discussion questions in which we are not vitally interested. The ladies should meet to spend the day, or a part of it, in discussing household and farm questions, as well as literary ones, for we do not want to lose sight of the fact that we must live, and try in all ways to make life profitable. It is not necessary for any one person to be much better informed than the others, as many times this might be a hindrance or discouragement, where if they are all equal seekers after knowledge there would be more affinity and less chance for rivalry. With literature might be discussed any question as to its effect upon the higher requirements of our nature.

The next question is, when shall we read or where get the time? If we compel ourselves to read so much every day, we can do it, and we must save the time. When my children were small I gave them the first part of the evening, calling eight o'clock their bedtime. After that, when the house was quiet, there might be an hour or so for reading. I also read while I stirred apple butter. Last summer I read "The Tempest" while I cooked preserves; had the book covered and used a thumb paper as the children do.

Now, after all this talk, my dear sisters, it will be up hill business, and no one knows of your special discouragements better than you do yourselves.

The progress of woman has been impeded at every step, and where the man passes unchallenged she is called to a halt lest she topple over some mouldy opinion or institution. We have been treated like children so long that we are somewhat frivolous; but frivolity in woman is misdirected farce; this same farce in children we used to call mischief until Froebel utilized it in the kindergarten, where it is the beginning of all good in education. So we, also, only need a guiding hand. We want to consign to oblivion that old couplet

A man's work is from sun to sun,
But a woman's work is never done.

When a farmer lays a land off, if it is not finished it is left at night out of mercy to the horse, and in the morning the work is taken up where it was left the night before. As I said before, let us follow their plans and we will get more out of life. With the dress reform movement, knit and ready made clothing, the sewing machine will be put away with the spinning wheel.

Over forty years ago Mrs. Bloomer shocked the civilized world by trying to introduce her costume. Now only a few antiquated minds would object to it, and we have come to think it extremely graceful, a thing of utility, a joy forever. I saw an eulogy upon this costume in a religious paper, praising it as a means of physical culture, and what a possibility for farm purposes. If Mrs. Bloomer could come to life now she would doubtless think that she had lived too early in the century.

The trouble with us is, we spend our time in ministering to others the things they ought to do for themselves, and when we do this we pamper to their selfishness, and hence are demoralizers. So many of us are Marthas "troubled with much serving;" but the Master said, "Mary hath chosen the better part."

In the early ages of the world the chief occupation of nations seemed to be war, either for conquest or defense. The women stayed at home to till the soil and care for the family, and a mother's proudest gift to her son was a suit of armor; but now we best equip our children for the battle of life by first informing ourselves, then we can sympathize with their endeavors to reach a higher plane of life. We are a great commercial, manufacturing and agricultural nation, our products are upon every sea, and we feed and clothe the world, so our time is taken up with money getting, and we allow a few minds to do our thinking, and unless women come to the front we will "perish by our own prosperity."

As there is no sex in intelligence there may be little girls living now who may be called upon to solve some great social or political problem in the future. I do not wish to make this a "woman suffrage" speech, but can not help speaking of some of the possibilities of my sex.

As in the past so many of our greatest minds have come from the farm, so in the future our sons and daughters will be required to fill important stations in the nation, and may they never by their actions cast reproach upon that hard working and indulgent father or that self-sacrificing and affectionate mother.

THE HOME.

HOME READING.

BY RUTH B ROBERTSON, CORTLAND.

[Read before the Jackson County Farmers' Institute.]

LADIES AND GENTLEMEN—The subject assigned me by your President is of so much importance that I feel it might better have been given to some one of more ability than your humble servant.

It is said that you may judge a person by the company he keeps; in like manner estimate a person's ability by the books he reads or by the books he leaves unread. In this country, where there is no censorship of the press, every one is left to choose the literature that suits his taste, or, more frequently, accidentally chances upon a class of literature, and not knowing of any other, cultivates a taste for whatever that may be, and is often the victim of a low grade of thought, pernicious and sometimes ruinous in its character.

I believe every young person needs a guide in forming his taste for reading. We all read. Almost all have a taste for reading, yet there is often no corresponding mental and moral development. And speaking of books and reading the question naturally arises, How can the farmer take time to read? Is it possible for him to have leisure for reading books? Surely, yes. By a systematic arrangement of his business more leisure than the merchant, the physician or the mechanic. At the nooning he ought to have at least one hour each day, and the evening an hour before retiring for the night, and of rainy days many times three or four hours might be given to reading and study; this for the summer time. But the long winter evenings probably affords the farmer his best opportunity. This presupposes that the farmer's wife sympathizes with him in taste for books and literature. The wife should know that the centre table should be placed in the cosiest room, everything removed from it except something to read. Then, when evening comes, let the lamp filled with oil, and the bright flue, and wick trimmed, be placed ready so that by touching a match the room may be lighted ready for reading. Then, do not distract his attention by irrelevant or impertinent interrogatories, but just let him alone to please himself with what suits his taste; anything from the Bible to the morning papers.

What ought the farmer to read? Well, he should be much acquainted with history, ancient, mediæval and modern; and biography, from "Plutarch's Lives" down to the campaign biography of McKinley and Bryan. Every American farmer should read a good biography of each of the Presidents from Washington

down to Cleveland, and then he is only half informed if he don't know something about the other fellow, the man who failed to reach that goal which is the American's highest ambition, sometimes the worthiest man of the lot, aside from official distinction, is a much more potent factor in the makeup of our country's history. Some objection might arise to this voluminous course of reading on the score of its expensiveness, but this might be overcome by the farmer taking a share in a library in the city, or by the farmers associating themselves together for a library of their own.

The farmer in this country ought to be a gentleman of culture; he has it in his power to be just that, and he ought, as the old aphorism inculcates, be able to "Sink the Shop," and when not actually engaged in operative agriculture should be able to talk and appear as a gentleman as much as if he belonged to the official or professional classes. The "hayseed" ought to be left where it belongs and the "dialect" should be left with the "hayseed." It is no one's business how a gentleman makes the bread and butter and sugar for himself and family, and he has no right to be pusillanimous enough to intrude it upon them, but I repeat it as a gentleman and a gentleman of culture. But culture, after we leave school, comes by reading the choicest literature. If one reads a high grade they will soon acquire a taste for the high grade and a judgment of the right kind. One can tell on hearing the first sentence of a speech whether or not we are going to have a speech worth listening to. So the very first sentence of a book will tell if it is the pure metal or only tinsel.

Who ever read the first lines of "The Lady of the Lake" without being struck by it at once? or listen to Marmion's first lines:

" Day set on Norham's castle steep,
And Tweed's fair river broad and deep,
And Cheviot's mountain lone."

A good judge of literature would read the book, or listen to Shakespeare, when he makes his discomfited military captain shout to his subordinates to "Hang out the banner on the outer wall," and feel the thrill in the very marrow of your bones.

Here let me pause and follow out what I think would be a suitable course of reading for a young farmer. He should read at least two chapters in the Bible each day; he ought to keep in touch with the panorama of current history by taking at least three papers—a religious, a political and a farm paper. In addition to this he should become familiar with the literature of the Elizabethan age and listen to its immortal bards "warble their native wood notes wild," and by a little stretch this might include "King James' Translation."

Then, coming further down the stream of history, take the great masters of the age of Queen Ann, and hear one of the "bards sublime, whose distant footsteps echo through the corridors of time." Go with old Homer to where,

" Jove convenes the senate of the skies,
Where high Olympus' cloudy tops arise,"

or stop and while away an hour with the little story of the Vicar. Then, coming down to our own times, read the literature of the Victorian age, the works of the great masters under whose magic power our refined English has become the court language of every court in Europe.

After all this scroll of "Old World" wisdom come to our American literature, so serenely Christian, so representative of the highest type of American civilization. Our Longfellow, and Bryant, and Holmes, and Whittier, and Lowell, and Fitz Greene Halleck, and Poe, and our own old neighbor, George D. Prentice. How I wish Lord Byron could have read American literature and learned in his sublime stanzas to avoid his covert sneer at our holy religion; it would have entitled his matchless intellectuality to undying duration.

Who so dull as not to love Drake's immortal ode, and admire how skillfully he paints our glorious old banner:

"She mingles with its gorgeous dyes,
The milky baldric of the skies,
And stripes its pure celestial white
With streakings of the morning light."

How intensely emotional Poe's adjuration to that being from the night's Plutonian shore:

"By the heaven that bends above us,
By the God we both adore,
Tell me truly, I implore,
Is there, is there, balm in Gilead?"

Every Hoosier farmer should be familiar with our own Hoosier literature, so recent in its origin, so intensely local in its characterizing and familiar scenery, the literature of our own beloved Indiana; God bless her green hillside, her pensive vales and boundless bottom lands; she is the loveliest gem in our country's tiara of bright stars; we almost worship her; behold her where she stands, bathing her golden locks in the limpid waters of America's greatest unsalted seas, and looking southward towards the sun, laves her immaculate feet in the blue waves of the beautiful Ohio; from her right hand, holding the Wabash, she pours a libation of greeting to the genius of the great and rising West; out of her left hand, holding the great Miami, she pours a thank-offering for the wisdom of the grand old East.

Yes, read our Hoosier literature. Hear Eggleston, "The Hoosier Schoolmaster," tell of his scholastic career on the scene of the well-known hills on the Brown edge of Jackson, and the great Lew Wallace repeat in his sublime style the world's greatest epic, the wonderful story of the "Christ," and lastly go pensively smiling with James Whitcomb Riley through scenes familiar as our every day life, in the beautiful Indian summer of an early autumn morning, and listen to the

"Clackin' of the guineys, and the cluckin' of the hens,
And the rooster's hallylooyer, as he tiptoes on the fence."

HOME ATTRACTIONS AND ADORNMENTS.

BY E. D. MENDENHALL, PLYMOUTH.

[Read Before the Marshall County Farmers' Institute.]

Every one at some time finds it very difficult to control his home surroundings, and would have it just a little different if it were not for what *some would say* or think. Public opinion often makes it a little hard for us to do what we think is for the best. We might say we are moral cowards. We love ease and the approbation of others too well. We do not like to butt our heads against a stone wall. I remember hearing a friend say he had been nearly all his life on the unpopular side of things; that it had been his fate to be one of the minority, but he had the satisfaction of believing he was right, and he thought many came to him rather than he went to the many. Very often our surroundings at home are much improved by our seeing what our friends or neighbors have. If *their* home is made pleasant and beautiful by books, music and culture, ours must be made so or we fall below the standard. It gives us a stimulant, and we are not satisfied with less. We must educate our children and give them better advantages than we have had if we want the world to grow better. But we can not spend ten thousand dollars on a home like some. Do not do it, for have you not seen and felt the quiet home life where only a few hundreds could be spared. The refinement, the sweetness, the perfect cleanliness of the surroundings made a home all would be proud of. Like some persons dressed in plain calicoes, they looked better dressed and made us more comfortable than those in silks. There are often persons we meet who seem to us at first very plain or homely, but they are so pleasant and make it so comfortable for us to be near them that we forget and really think they are beautiful. So with our home surroundings. It is not all hard cash that makes the pleasant home; very often the more hard cash spent the more homely it is. It is possible that our surroundings often make us do things that are much better for us that we yield to public opinion; but if your child is about to be controlled by a bad neighbor, what then? Some think it much harder to control a child than years ago. I think not; but we all know that it costs very much more to raise a family. Public opinion is much more wholesome than years ago, and parents are not expected to go beyond their means; but we all know that to compete in the various avocations in life we must be prepared and have the ability, endurance or pluck to succeed. If we are not prepared, we fail. Where two commence in life on an equal footing, work together for the home they see in the future, and after many discouragements and difficulties realize their hopes, it seems sad should the husband pass on to the better land to have *his* distant relations come on and say two-thirds of this home belongs to us. That is, if no children bless the union, it will be sold from her who has equally toiled with him. How different if she should die. It's all his; no such trouble with his mother-in-law. And the wife

can not leave it to him as long as he is her widower. He can get married in sixty days or less, if he finds any so foolish, if none of his relations interfere. Now it seems to me that the law is unjust in this matter. If a man wishes to obey the golden rule, he should by will or deed place one who is entitled equally with himself in that home on the same footing.

In choosing the place for a home on a farm, too many look for convenience and not the surroundings. Instead of a commanding eminence or high spot near a beautiful grove, or some other natural surroundings of beauty, they look for a pond where the hogs and ducks have it comfortable, and, alas, too many put their pens in front of the house convenient to the road. In such a home you do not expect to find the refinement and culture that good books, music and pictures bring. The business man in town does not do that way, because he studies the business way of doing things. The man who does not meet his obligations promptly is often thought dishonest, but is not. He has not studied the laws of business as he should, and those in the country are often blamed wrongly for it. I often think that a real successful farmer is one who must be a man of good common sense in almost any line of business, for there are thousands lying in wait for him, from the lightning-rod man to the gold-brick racket, Bohemian oats and the cheap-grocery man. He is almost sure to be caught napping unless he never signs his name to any paper for a stranger. The home that children look back to with pleasure, as well as parents, must be made cheerful and happy by neat and healthy surroundings. In this part of the State we can have good, pure water by driving a well where we want it, so there is no excuse for putting our home in any but a beautiful and healthy spot. Take some advice of your neighbors and friends about location. Two heads are always better than one. Your wife and children should always be consulted, and if you can not convince them, and you can not agree, arbitrate. In passing about the country any one can see that some homes are more beautiful than others; that the buildings seem to fit the surroundings, the colors are harmonious. It is restful to the eye. There is a sense of pleasure in this. Fences are straight, fields are square, hedges, if any, are trimmed and in order, no unsightly trash near, barns and pens back in order. What a pleasure to the passer-by. And you expect the proprietor and family of such a home to fit the place—grand and noble. After all, intelligence is the standard.

The farmer or laborer who is refined, cleanly in his habits, and goes about in garments suitable for his work, must be respected. He may be elected governor of the State and give us an administration of good common sense, clear of all corrupt rings and down some of these huge monopolies we are cursed with.

Human beings are liable to go to excess in eating as well as drinking. Food should be of the best, healthy and nourishing. The laws of health should be a study of all. Half the time doctors' visits could be avoided. In some homes this is a serious expense. A farmer is respected for what he is. If he wants to visit the town or his neighbors in ragged and dirty clothes, he can do so, but he is surely more respected to go neat and clean like other men. Lay off the overalls like the mechanic in the shop; make it pleasant to the eye of the merchant, or any one, and he has the respect of that one. The pictures of the farmer are usually rather tough looking because he will dress that way. I dislike the dress of a dirty, slovenly

farmer. Cleanliness and neatness are next to godliness. The writer has differed for several years with some of his farmer friends about trees on a farm. What is more comforting than to see cattle or other stock in the deep shade of a tree in a field? It seems to me the tree almost rejoices to gather them under its arms in peace and comfort. The merciful man is merciful unto his beasts, and how a tree adds to the beauty. What if you can't plow under it and run your machine under it? Instead of sixteen cents for the corn you might raise the sheep will thank you a thousand fold. Don't be so selfish. There is something besides money in this world, though of course that means much to all of us. We must have books, papers, pictures, furniture, music, but we can get along better with less of these than be without friends. Your neighbor must be your friend. We can not live alone. Sickness and death enters every family. Then you can not afford to have an enemy. It does not pay. Settle all these little differences. Never let a line fence destroy all your happiness. Never let the afternoon of life pass to the sunset without a friendly greeting to friend and neighbor. It seems to me no man can leave a better monument to his memory than good, solid, honest buildings. First place, there should be a solid stone wall—commence right. How often do we see what ought to be permanent buildings on wooden blocks. Don't you always think the building a sham, and the man, also, unless it is for temporary purposes? You often think of a man, after he has passed to the beyond, by his works. If he builds good works you can not help having respect for his memory. Don't build a sham. It may not be large and expensive, but build solid, that it may live after you. Be careful to build in the proper place. Surround your home with beautiful trees and flowers, and the world will honor and respect you. The writer, a few years ago in business, often came into the homes of the farmers, and was surprised and pained to find that so many of them were so barren of books and papers and no bright pictures on the walls; the weeds that might have been flowers by the roadside; the walls were dark and gloomy. Don't you know its hard to keep a son or daughter in such a home on a farm? They love the light, beauty and gladness of other homes. The son is often led by easy steps to the gilded saloon, where light, brightness, and to him it seems gladness, prevails. Give them better things. Let them have a few things they want, if you have to do without your tobacco. Let the son try his hand buying and selling some stock. If he gets stuck once in awhile its no more than you did. Its a good experience. The father who never lets a son even buy his own clothes until he is of age ought to remember we live in a republic and that one man power is apt to fail here; that even women and children have some rights the lords of creation are bound to respect. The writer believes the day will soon come when no teacher or parent will have the lawful right to strike or beat a child; that punishment with the rod is a relic of barbarism come to us from the dark ages. No teacher who uses the rod is quite up to the standard of the light and civilization of the nineteenth century. No home is complete, especially if it is the home of young persons, unless they have some amusements—something to excite mirth and good feeling—music, dancing and games of different kinds. I know there are persons who object to these things, and think life is thrown away in that manner, but young people must have recreation and amusement. If you can have them at home and control the time and place, there

is no great danger. The wrong, it always seemed to me, was in excess—the abuse of the amusement. I have always thought that to entertain a mixed company well was an art to be cultivated.

PARTNERSHIP IN THE HOME.

BY MRS. W. O. MOORE, RENSSELAER.

[Read before the Jasper County Farmers' Institute.]

Partnership means union—one in aims, one in purpose, one in interests. In all the relations of this life there are partnerships as relates to business of all kinds, but in no relation are interests of such manifold importance as those of the home, second only to that partnership which allies us to God and to Jesus Christ, his son. If this firm of husband and wife be one of confidence and affection there will be mutual confidence in all that pertains to the welfare of the home, and without this there can be no realization of the real meaning of the sweet name home, and if God blesses this union by giving to the parents immortal souls to train up in the nurture and admonition of the Lord, there is added an increased responsibility and the necessity of adding to this partnership the children which are as a seal upon the bond which unites all in the home relations of parents and children, and completes the partnership in all of its fullness. It is conceded by all that the farmer's life is the most independent of all vocations; providing the farmer and his wife are industrious and economical, there will always be food and the necessities of life in abundance. But one is not satisfied to merely have a living. All are anxious to have a competency—something laid up for that time when health may fail, or old age creeps upon us and we are unable to work.

Let us enter this farmer's home, which is an ideal one, of the nineteenth century. The farmer has perhaps 100 acres of good land, but he says to himself, this is not enough to hire hands the year round, and is too much to do without help. Now, what is the first step to be taken in this partnership? After supper, when the chores are all done and the family are gathered around the table for an enjoyment of home comforts, the farmer with his agricultural paper, the wife with her mending or knitting, the children conning their lessons. The farmer lays down the paper and says: "I need more land and neighbor Jones has eighty acres joining us on the other side of the timber lot, which is situated just right to make our farm complete." He describes the good soil, how well watered it is, and how much work has been done in tiling it, and "that it is a most desirable piece of property, and neighbor Jones will sell on easy terms, but if we decide to buy it we will have to go into debt and it will be necessary to practice the closest economy, and after a few years we will experience the benefits of this expenditure."

The good wife and children listen attentively to this plan and become interested in its development, and they say that "is just the thing for us to do." The

wife says, "I will deny myself this and that." The children talk of what they can do without. The eldest daughter says, "I will wait a year or two for the new piano." The wife will wait for that new carpet and curtains which she has had her heart set on so long, and because of this confidence and deference to each other's judgment they are ready to make full sacrifice of former plans. The debt is assumed and all work together, until after awhile the debt is provided for. You notice that it is *we* and *ours*, and not that "I intend to do thus and so."

Consultation of partners in the home is the incentive for all to practice close economy in the home. To do their best. The daughter who is thoroughly trained in all things pertaining to the home, and who thinks she ought to consult parents as to her expenditures, is ever ready to take advice on the subject of dress, etc. Mother and daughter plan and make, turn up-side down and inside out to provide for necessary expenses of going to school, but, practically, the education in carefulness and economics have been acquired in the home, and without this development of method and system in carrying on our every day affairs the knowledge we gain from books will avail us but little.

In one town where we lived I had for a neighbor a minister. His wife and I became very warm friends. She was well versed in French and the art of painting, but knew next to nothing about carrying on a home, and the simplest household duties were difficult for her. She said to me: "Our elder's wife makes up so much new cloth every spring, and I take her as a pattern and have done the same." She did not realize that she had only just begun housekeeping and there were only two in her household and a large number in the elder's home. A lack of judgment, and nowhere can this be gained as in the home. There is nothing pays better than to provide reading matter in the home. An agricultural paper for father, a household paper for mother, a fashion magazine for the daughter that she may at least be able to cut and make the clothing worn at home and cultivate the taste and educate the fingers to do more than this if possible. We see every day more and more the necessity for daughters to be trained for self-support, and where can this be done better than in the farmer's home if the necessary appliances are not wanting. The farmer wants his mowing machine, his reaper, sulky plow and horse rake. The wife and daughter need a sewing machine, a washing machine, wringer and the best churn, and various labor saving machines by which strength and labor are saved and home life made not only prosperous by the saving of physical strength but also made happier by the ability of each in the household to have more time for reading and storing the mind with those things which make for the peace and happiness for all connected with the home. I have been in farmers' homes whose library was equal to the best, and whose center stand contained the best magazines of the day, and whose families for culture and refinement were fitted for what is called the best society. I think this is brought to our view in ex-Governor Matthews and in our present incumbent, Governor Mount, both being farmers, one coming from the farm and the other retiring to his farm in preference to taking to an office or professional position.

Some may say "I thought the subject was economics, and that means economy in the home." There may be different ideas as to the meaning of the word. I

have from observation seen there are different ways of practicing economy. I believe the customary way is for the farmer to say to the wife, "You can have all the profits from the hens and the cows," and he has the profits of the farm. This may seem generous, but sometimes the hens cease to lay and cows to give milk. Where is the wife's income then? Why not use the butter and eggs as commodities, to be used in trade for supplies for the benefit of the family in general, and when there is grain, corn, potatoes and cattle to be disposed of hold a consultation, that all interested may have a voice in the matter, and that there be but one treasury and husband and wife have equal rights. Where there is equality in labor or interests there should be a corresponding equality in profits. It is so in all partnerships that relate to business, and there should be in this closest of all partnerships of husband and wife. If a man would consult more with the wife it would no longer be said that "women do not understand business." Dr. Talmage says: "There would be less business failures if men would confer with their wives." The husband labors in storm and sunshine to make the home; the wife labors untiringly from sun to sun to keep the home. The children, subject to the parents, yet ever the golden chain which binds all together in one symmetrical whole, bear their part in this labor of love, and ought to have a share of the profits, that it may be a source of encouragement to persevere in everything they are called to do as junior partners in this firm, and which can not be severed by any earthly hand as long as confidence and affection are made the rulings of their lives.

" Home is where affection binds
Gentle hearts in union,
Where the voices all are kind
Holding sweet communion.

" Home is where the heart can rest
Safe from darkening sorrow,
Where the friends we love the best
Brighten every sorrow.

" Home is where friends we love
To our hearts are given,
Where the blessing from above
Makes the heart a heaven.

" Yes, 'tis home where smiles of cheer
Wreath the brow that greets us,
And the one of all most dear
Ever comes to meet us."

RESPONSIBILITY OF PARENTS FOR THE SUCCESS OR FAILURE OF THEIR CHILDREN.

BY MRS. JENNIE ERWIN, BOURBON.

[Read before the Marshall County Farmers' Institute.]

This topic was selected for me by the committee who kindly put me on the program; and I must confess that at first it occurred to me that they selected the subject out of curiosity, to see what a mother with a family not yet old enough to prophesy whether in the eyes of the world they were successes or failures, would venture to say on the subject, and I have not found it an easy task. For what is success or failure, and to what degree parents are responsible for either, I do not know, and, in the language of Samantha Allen, "Joshua doesn't either." But there is one thing we do know: We are responsible for our children. This is desperately true, and is a responsibility before which we may well tremble. No position in life equals this in importance. And when we have called into existence a soul with all its capacities for pain and pleasure, for vice and virtue, for life and death, we may well set about considering our responsibilities in the matter, for "at their birth we set in motion whole rivers of predispositions, good or bad, as much more powerful to shape their future than all tuitional and regulative influences that come after, as they are earlier in their beginning, deeper in their insertion and more constant in their operation."

These predispositions we can not wholly control; but how we shall aid or retard their future growth, is ours to study faithfully. The mother who brings a child into the world and lays it on her bosom sees clearly that her affairs are more serious than the affairs of men. For "a partnership with God is motherhood. What strength, what purity, what self-control, what love, what wisdom, belongs to her who helps God fashion an immortal soul."

We agree that every child has a right to be well born. But they are not all so well blessed, and it shall be my object to those whose children, like ours, have inborn traits handed down from parents and grand-parents, back indefinitely, against which they have no defense but the great eternal will, which is also their inheritance, and such aid as we can give them out of the multitude of lessons that have come to us through heartaches over our own failures

The Hon. C. H. Reeve said recently: "He had been studying many years to find out what truth was in some of the relations of life." But a great majority of us unthinking ones have been going right on in the rut we were born into, never realizing it might not be the true way.

Not long since I heard a woman say: "If every one would raise their children as I am raising mine, they would never have any trouble with them when they were grown up." And when I saw the glow of satisfaction on her face, one could but hope that God in his infinite mercy would remove her from earth before

the result of her cruel misunderstanding of the heart and brains of her little ones would bear fruit in misguided and rebellious maturity. For when her children are governed by fear, what can hold them when the fear is gone?

They must be failures who do not learn self-control. How can they learn it who are slaves to the will of another? Their reason and judgment undeveloped, untruthfulness and cunning cultivated in devising means to escape the punishment they see no justice in, and in reality there is none there. And these, in the minds of some people, are called well-governed children.

There are few parents who do not realize that this greater work is to aid these children to grow into helpful, honest citizens. Yet this is even sometimes lost sight of in the desperate struggle to "get on." The intense application to detail, in doors and out, that are absolutely necessary if one can make a living in the present condition of things, means that we must lay ourselves body and brains on the farm altar, and if the soul escapes we do well; and although the farm is the best place on earth for children to grow up physically robust, which is the first requisite to success in life, there are some disadvantages which I wish to speak of. The successful farmer, financially, is the one who is up and ready for business early, who puts in fourteen hours at hard physical labor, and comes in at night too tired to read a word or give an intelligent answer to a child's question, thus missing an opportunity to give knowledge when it is wanted, and that opportunity will not come again. The mother can not take time to answer for the work is not done yet, and when it is she will be too tired to even say her prayers. Thus physical exhaustion robs them of an opportunity to help their children to success in a broad sense. By making drudges of ourselves we rob our children as effectually as if we fail to do enough for them.

We never hear of a strike on the farm. But would it not be a good thing to draw a line at ten hours a day hard work, eight hours for sleep and six hours for the cultivation of the brain and hearts of ourselves and children? Does it seem unreasonable to give a fourth part of our time to the development of that part of our nature to the only pursuit that gives a genuine pleasure, that avails anything at the last? That defines what we really are. Samuel Gompers, President of the American Federation of Labor, is urging all labor organizations to unite in a movement to secure a general eight hour workday law. And so we claim it is not asking much for the farmer and his wife, without it be in haytime or in harvest, just dropping everything after ten hours of work, with a little margin of strength left, enough for a romp with the children, then a settling down for a good talk, it matters not much what topic. They will ask wise questions and expect honest answers. Not the slightest deceit can be practiced here and go unpunished. You are laying a foundation deep as eternity, and you must not let false ideas get into the foundation of the character you are building, and not a single word or act of yours but goes into this structure of the man or woman you are forming. Your precepts must be good, your conduct must tally with them, or you are not getting on in the world. No matter if your bank account be growing marvelously, you are a failure and your children will follow after you. If the bottom stone be not justice, if it do not permeate and possess our lives, if it be not the object striven for

in every act in the home, our building will be on the sand. But if truth be in the inward parts, and children live and breathe in this atmosphere, they will not be failures. And yet it falls to the mother more than any other being to furnish the gold of life or dress of death. From her are the first lessons learned, and earlier, often, than she suspects.

A few weeks ago on the train I saw a mother with a baby a year old. It was restless and wanted on the floor, and she told it there was a big dog coming. It glanced down the aisle, then keenly at her face, and began to struggle to get down. It knew before it was a year old its mother was untruthful. I wonder will it ever have full faith in her. Will she ever wonder why her child is unreliable?

There is one thing we can all give our children—a happy childhood, the memory of which will be a blessing and safeguard as long as life lasts. It does not require much money, not even what some term comforts, to make a happy home. Talk is said to be cheap, but if it be kind, gentle and sincere, it's the dearest thing on earth. A wee cottage, with bare floor and whitewashed walls, may be a kingly residence. If the wealth of love and sympathy be there it is rich in furnishings, and from such homes as these our greatest men and women come. The lack of luxuries makes healthy bodies. The industry and frugality necessary there develops business ability. The honesty and kindness of the parents makes character, and happy home life saves from temptation. Our abandoned criminals do not come from happy homes. The odds are they have been wronged as much as they are wrong; cheated out of love, they can conceive no measure of happiness but in sensual gratification; no sweet memories of childhood or bright anticipations for age, they deserve only our pity. I am talking to mothers, and who are just as busy as fathers, and if they are not they should be, for this is no time to trifle. You have serious business on your hands when the little ones are about you, but you must not look serious. Your face makes the sunshine of the home.

“ Would you know the babies' skies?
Babies skies are mothers' eyes,
Mothers' eyes and smiles together,
Make the babies pleasant weather.

“ Mother, keep your eyes from tears,
Keep your heart from foolish fears,
Keep your lips from dull complaining,
Lest the baby thinks 'tis raining.”

True, you must work, but not so hard there is no margin left for cheerfulness. Let everything go but your patience. Do without your dessert for dinner, but never dispense with cheerful talk and laughter. Make the meal time last as long as you can; not with courses of tempting food—let what you eat be plain and wholesome, but let the table talk be as rich and spicy as you can make it. The family table should be a school of culture and refinement. It should be a time to discuss the topics of the day and harmless gossip, for school happenings, the baby's last funny saying, peace and arbitration between Great Britain and the United States, but do not talk about good things to eat, what you do or do not like. That does not matter much. Do not complain or worry if you have done the best you

can if the dinner is not as good as you would like. That, too, doesn't matter much. We have a man that travels with a trashing machine in the vicinity of Bourbon who is jolly, and at meal times tells such funny stories that we don't have to cook much of a variety, for no one seems to know what they are eating, they are enjoying the mirth and laughter so, and are sure to think they had a square meal, but ask the bill of fare and very few could tell. A hearty laugh is a powerful tonic, and will do more for that "tired feeling" than Hood's sarsaparilla, and it is something even farmers can afford. If you are at a loss for material you can get a collection of comic almanacs, for nothing, too, and although they are not literature to be recommended, they are far in advance of a discussion of our aches and pains, or even worse, "how awful much work we have to do." For pity's sake, do not complain of your work; think of the innumerable army who long for work to do. Get down on your knees and thank God for the work that tires. The time will come when there will be no little ones to claim your care, when you would give anything for the sight of grimy finger marks to rest your tired eyes on, tired because you have no one depending on you and your house stays so orderly. Oh! these happy, golden years will never come again. "Oh! improve them as they fly, these happy, golden years." When our children are with us, and we can plan and plot all day long what they shall eat, what they shall drink and wherewithal shall they be clothed, if there is a happier or higher condition in life we never heard of it. All that home has been, is now, and even more will be, is ours to work at. If this does not drench us with the love of God and man, it is not worth our while to dream of the many mansions promised we are not worthy to enter in.

In conclusion, what is success? We may differ, but it is worth while to give this matter earnest thought. I have only time for a glance. Every honest, industrious man who wants fairly to earn every dollar he spends, and who spends this for the benefit of those he loves, and who denies himself to get a home and a margin in case of disaster, and does this cheerfully, is a successful man if he is never heard of outside the ward he lives in. While his neighbor may accumulate millions and keep thousands fawning on him out of fear of his displeasure, and who looks upon mankind as so many tools to work for his benefit, is an utter failure. He is not getting on and he knows it, and endows colleges, bequeathes libraries, gives to charities, and tries to satisfy himself vainly for lack of justice. But this failing, all things fail. The darkey who said, "Dis ground am so hard, the cotton so weedy, and the sun so hot, dis nigger am called to preach," will be a failure in winning souls to Christ. The woman, educated, beautiful, a leader in society, who slanders one against whom she has a grudge, by a shrug of her shoulders or arching of her graceful eyebrows, which may mean so much or so little, is a failure, though she may lead the five hundred. The idle fault-finders are failures, no matter what position in life they fill. The industrious, cheerful and just are successful, no matter if the vicissitudes of life bring them at last to the county asylum to end their lives. To us things do not seem to come out right; we can not see the hand leading, guiding, arranging and weaving the confused, tangled threads of human life into the grand, clear, noble pattern of a Divine purpose;

and because we can not see the end from the beginning, we seem to feel justified in complaining James Whitcomb Riley recently expressed this in dialect form. He says:

“ Us farmers in the country, as the seasons go and come,
Is purty much like other folks, we’re apt to grumble some;
The spring’s too back’ard for us, er to for’ard—ary one—
We’ll jaw about it anyhow, and have our way er none.
The thaw’s set in too sud lent, er the frost’s staid in the soil
Too long to give the wheat a chance, an d crops are bound to spoil.
The weather’s either most too mild or too outrageous rough,
And altogether too much rain, er not half rain enough.

“ Now what I’d like and what you’d like is plain enough to see,
It’s just to have old Providence drop round on you and me,
And ast us what our views is first regardin’ shine or rain,
And post ’em when to shut her off, or let her on again!
And yet I’d rather, after all, considerin’ other chores
I got on hands a tendin’ both to my affairs and yours—
I’d rather miss the blame I’d git a runnin’ things up thare,
And spend my extray time in praise and gratitude and prayer.”

Now the parents here realize how I have not been able to express the half we feel. How the question grows and grows, and takes such hold it chokes us with its importance and we can not express ourselves. We can only pray without ceasing, work without stopping, and in everything give thanks and trust the Infinite to guide our own in ways better even than we know.

AIDS FOR THE FARMER'S WIFE.

BY MISS CLARA LUTZ, OF SHADELAND.

[Read before the Tippecanoe County Farmers' Institute, February 19.]

It was not specified as to whether our discussion of “Aids for the Farmer's Wife” should be from a domestic or an intellectual point of view; but since one so necessarily leads to the other, we have decided that both are included in one. Does not the woman who has all needful appliances for her household duties undoubtedly have more time for mind culture than her more unfortunate sister who is still plodding along in the same old way that her ancestors have trod, under the sad delusion that the good old ways are the best and only means of accomplishing the desired end?

We must all acknowledge that the atmosphere of the home will bring about either happy or unhappy results, just as the influence of the maker of that home is for good or for evil.

It is an easy matter for the woman with every household comfort and plenty of service at her command to respond readily to the demands of both family and society. But it is she who is in the less favored position in life that we have been asked to deal with to-day.

DUTIES OF THE FARMER'S WIFE.

The average farmer's wife is expected to be her own laundress, seamstress and cook, and in addition to be a cordial hostess as well as to always receive her own family with smiling face and unruffled temper. Also to be quite tidy and presentable while fulfilling her domestic duties. She must find time to read the recent books, and particularly the newspapers and periodicals, else how can she hope to be a congenial companion to her husband who is interested in the questions of the day?

First of all, in order to make those about her happy it is quite essential that she herself be happy, and in order that she be happy she should not be taxed to the full extent of her physical strength.

But how can she accomplish all this? The method may not be an easy one, but she may, at least, look about her and begin to calculate as to how best to economize her own strength.

Science and mechanics have done much for the farmer; therefore, why may they not be employed in relieving the farmer's toil-worn wife?

WHERE HELP MAY COME FROM.

It is only too true that much of the economizing in many a farmer's home is wholly on the part of the wife, while the farmer himself has all the latest improvements in farm implements and appliances necessary to his vocation.

Let him do without that new binder (next summer), which is only a slight improvement over the old one, and instead put the price he would have paid for it into a few little household luxuries; that is, luxuries in the way of saving steps. Let the water be piped into the kitchen. Oh, how many weary steps that would save!

Let a dumb-waiter be adjusted, capable of sliding from cellar to kitchen, thus saving some of the trips up and down stairs. Then, perhaps, there will be a surplus sufficient to defray the expense of putting in a sink, which will also prove itself a valuable adjunct to any housekeeper. Thus when he experiences for one season the inconvenience which will probably follow his denial he may realize just how deficient and how few are the articles which his wife has been using and the result the following summer may be a new binder purchased for himself, together with some long much needed articles for the comfort of those concerned in the house work.

WOMAN IS A PATIENT WORKER.

Woman too often bears a drudgery uncomplainingly under the mistaken idea that she is economizing, when but a mere hint or suggestion from her would be quite sufficient to secure for herself any help that a willing husband could provide for her. He is not naturally selfish, this man, but she has borne her burden without a murmur for so long that he has ceased to give the matter a thought. But has she truly economized? She has drudged until her system is thoroughly exhausted; then, perhaps, there is a physician's bill which far exceeds the cost of the article she has been denying herself. But is this yet all? Her weariness has made her look older than her years. There are unnecessary wrinkles and needlessly misshapen and discolored hands. In her despair she wonders if life is worth caring for.

HUSBANDS ARE NOT CRUEL.

Any man had rather be a little out at pockets and have his wife retain her dimples and roses than to be ever and ever so wealthy but with a weary, old and worn looking wife at his side. Therefore, let her overcome some of her false ideas of economy.

And now for her intellectual pursuits. Too many women say: "Why, I haven't time to read the newspapers, not even considering books." Do we say we have not time to make ourselves presentable to our friends? Never. If we haven't the time to spare we take it, for it is a necessary duty. And, also, is it quite as essential that we have an intellect which is as pleasing and presentable to our fellow beings as it is possible for us to make it.

THE EXCUSE OF LACK OF TIME..

Would we say we have not time to spare in which to attend religious services? Oh, no. It is a matter of the welfare of soul in this case. Ah, but have we stopped to think that growth of mind must precede growth of soul? It is not possible for man's intellect to lie dormant. It must either be expanding or contracting, and if higher and better thoughts are not daily stamping their impress upon our countenances then the soul must be undoubtedly becoming narrower and more shallow. The question now rests with us: Is it right to allow to remain uncultivated so sacred a thing as man's intellect? We pity unceasingly the poor imbecile, but really is not the one who never uses the power given him to be equally pitied?

Therefore, from a matter of duty should she take the time for reading and for mental development. I once had a teacher who urged her class to read, read if for only ten minutes each day. How much was contained in those few words! And what a lasting impression they have left with many of her pupils!

SOMEWHAT HARD TO CATCH UP.

If one has neglected her reading or studying for some time it will at first perhaps be distasteful to her, but constant application will overcome this difficulty, and what was once a trial will become a pleasure.

A good book is a most excellent companion, and though perhaps women in the country are to some extent barred from social pleasures, yet the stories in our current magazines may help to atone for some of this sacrifice, and a glimpse into the very cream of society is furnished us by such writers as Mrs. Burton Harrison, Julia Magruder, Rudyard Kipling, Richard Harding Davis and others.

I know a woman who, though self-made, has a very good education, who made this remark: "I frequently allowed the potatoes to burn because I was too interested in my book to think of the meal which was preparing."

Undoubtedly the person who ate those potatoes suffered some inconvenience, but that young woman is at present quite independently comfortable on a paying salary, and all because she used the gifts which were given her.

AN INSTANCE IN POINT.

Another young woman of my acquaintance made a regular practice of driving from her home in the country to the city some miles distant, at least once or twice in a month, for the purpose of spending an afternoon among the papers and periodicals in the city library. Consequently, that young woman occupies at present an enviable position in one of the leading universities of the country.

There are private circulating libraries from which many persons derive much pleasure. Two or three families will agree among themselves what magazines to procure and each providing one of these, and, having finished it, will pass it on to the next, and so on, until each magazine has gone the rounds, when all have enjoyed them. The next month the same is repeated.

But if this is considered too expensive, then surely there is the city library at one's disposal whenever one is in the city with perhaps a weary hour to wait.

WOMAN CONTROLS HER DESTINY.

Each woman is largely what she makes herself. We love to find her domestic, comfortable, cosy and suggestive of home and yet to possess these qualities. She need not be haranguing at every social affair all the household duties which she has just succeeded in performing that day. We like to know that she can do all these womanly things, but am I wrong when I say that it detracts from her, makes her seem a little plebeian when she recounts all these household feats?

Wouldn't we admire her more if, instead of reminding us of our daily routine, she would brighten and help us by discussing something of literary interest to us?

Not that we would discourage housewifely qualities for one instant, on the contrary respect and admire the woman who is interested in her home. Little

Queen Wilhelmina of Holland is taught all the sensible things that any intelligent girl should know about a home. Queen Victoria has never despised little things, but much to her credit and the comfort of others has given them due attention, and where is there a more beloved sovereign than this same queen?

I do not doubt the fact that many of us have been wearied more than once at some little afternoon tea or evening party by being compelled to sit and listen to some individual recounting the number of loaves of bread she has baked that day, or to her latest improved method of putting up fruit and so on and on. When perhaps just by our side sit two women who are having a most interesting discussion over some book which we have so enjoyed and want so much to discuss with them.

Do we remain long with our first companion? I am rather inclined to think that the average person will seize the first opportunity which presents itself to leave her alone with her bread and pickles.

TIME AND PLACE FOR ALL THINGS.

But there is time and place for all this and women may certainly get ideas from one another which may be helpful to them in the work about the house.

Therefore, for this purpose let a housewife's club be organized, the aim of which is to discuss affairs pertaining to the home only. Great benefit may be derived from such an organization, and in this way the woman who is so thoroughly domestic may have her full degree of satisfaction.

Harriet Beecher Stowe, who fairly shook the whole world with the sentiment contained in her story of slavery, was a woman who had many humble duties to perform; yet we may see from this example that it is not always she who is born in the midst of luxury who is best able to do great things.

Elizabeth Browning, who wrote so many beautiful poems, was born and spent her early years in the country, as did George Eliot, the famous writer of "Silas Marner."

We do not know what we are capable of accomplishing until we make an effort to our own satisfaction. If we can not do great things, we can make the most of the gifts we have, and, above all, learn to grow old gracefully, at peace and in sympathy with mankind.

Perhaps Holmes's expression applies best here, when he says:

"Build thee more stately mansions, O my soul,
As the swift seasons roll!
Leave the low-vaulted past,
Let each new temple, nobler than the last,
Shut thee from heaven with a dome more vast,
Till thou at length art free,
Leaving thine outgrown shell by life's unresting sea!"

HOUSEKEEPERS' CLUBS IN THE COUNTRY.

BY MISS JENNIE BOOTH, WEA.

[Read before the Tippecanoe County Farmers' Institute.]

We, as farmers, are moving onward step by step, since science is making possibilities only dreamed of by our fathers. Our brothers, in their trades, have their organizations for the study of their scientific subjects, for national protection, political power, or whatever attracts their fancies, and are proving that there is strength in union.

Then, why may not the best good of the farm be advanced by a greater unity of thought, sympathy and purpose by banding together as workers for improvement and advance in education, and the golden rule over all.

Few housekeepers realize how much a little change is needed; how far they are over-taxed to meet the demands about them, until some day, when it is too late, they feel that they should be equal with others in the race, where all have a fair start, and of leaving a family provided for. They make too much of house-keeping. Life is altogether too valuable to render it all to these little wants.

As a practical way of carrying out these ideas, let several neighbors unite together, meet once a month at one of the farm houses, or some other convenient place, just as our charity organizations do when well arranged and supported; serve as relief exchanges, so that these concerts may bring about methods and aims as helps that might be the means of spreading information of special interest throughout the country. This could not fail, if wisely directed, to be a great educational force, not only to its own members, but through them to others. Nothing is more broadening in character than to know what others are doing. Nothing is better to break down prejudice than to find that those whom we thought out of the way are trying, according to their best light, to bring about the same reforms we are trying to further. Every housekeeper will be found eager to discard present methods, if better ones will do more efficient work. These clubs might send a vast amount of sunshine into half a hundred homes, and reach us who are already too old to go to school.

Our city friends have their parlor clubs, their Chautauqua and reading circles. Now, if they are advancing in practical education and we are not, who is to blame? Every farm neighborhood has some talent that has been laid away dormant because there was no use for it; and it would be a surprise, and also a delight, to find a great many bright people who are able to add to the enjoyment and improvement of the neighborhood.

My experience with club work of any kind is very limited, but as far as I do know clubs have been crowned with success. There is in our country a band of ladies whose object is to work for those who need. Anything that helps another is proper work for this society. A nice lunch is taken to one of the farm homes, where needed work is done. But their greatest claim to glory lies not in the elegant

lunch served. The bright faces of the children in the orphans' home, the calm trust of the sick in homes of poverty and loneliness—these all speak of the earnest work of those faithful "Willing Workers."

Lowell's "Sir Launfal" says: "Behold, through Him, I give to thee."

Such circles are inspirations to us all. The weak and poor are all around us. Sorrow has entered many homes. Such an effort declares that life is not only worth living, but of all of happiness and helpfulness. Of course, it would not be necessary to always talk about housekeeping. Literary wants will need to be supplied; books will be introduced. Progressive housekeeping would demand some attention, for we all incline to do as grandmother did, and it is well to stop and consider whether there is not a better way. The fact that learning to cook is very popular with all classes of people will introduce this subject in such a club, and might furnish many wholesome results for the future in the way of better cooking. Within the past year hundreds of young girls have graduated from the Boston cooking school. It is hard for us to say, though, how much the standard of cooking has been raised. Then, as long as it is to be fully one-half of our life work, it would be well to treat the subject scientifically and learn what proportion of the cost of living might be saved by the economy of foods. We all know the cook carries the great responsibilities of life. How often has a badly cooked breakfast clouded the blue sky of a day which was meant to be all sunshine and singing birds. I am a cook myself, and know, too, that it is not considered one of the fine arts, and yet it is very useful. The cook herself is like the old-fashioned "live forever" plant, very useful in the garden but not beautiful. No one wants it for a buttonhole bouquet.

Now, it is well to remember that whatever work we do we are not injured by it if we do it well, the whole matter resting with ourselves as to the manner in which it is done. Then if it has so much to do with framing the dispositions of those around us, it is worth while to become students in the matter.

The secret of success is to do something every one wants done, and to do it well, no matter how humble the work may be. Perfect mastery of it makes it a success. If we are to be cooks, let us be thoroughly good. Its value will be enhanced tenfold by being well done. We all remember the story of the blacksmith causing the loss of the empire by badly shoeing the general's horse.

The aim of these clubs should be educational. The housekeeper says, "I have little time to read." But if she keeps her mind open to the things science is placing in her hands she might save time, labor and strength also. The woman of the olden times, whose book-case was very slender, had no better health nor power of endurance than the woman of to-day who has learned languages and pursued science. Indeed, the woman of that time had not even the length of days we have now.

Entertainment, also, should be found in these circles for all members of the farmer's family. The boys and girls are so often overlooked.

The girl on the farm is worthy of every good thing. She is not the young lady we read about whose mother is always tired. She performs day by day some useful part of the work, though she is not always well paid. She is the gentle nurse in sickness; she is the steady light of the farmer's home.

The children are not forgotten. The pleasure furnished them will be magnified when they take a backward look through the mists of early days to life on the old farm. The help should be kindly remembered. It would not be the housekeepers' club without the cook. Then, in many cases, it is the only home the farm hand has, and he appreciates every kindness in that home and returns it a hundred fold.

In regard to a plan for these clubs, I think after organization that would suggest itself, and the program also. But let us take seven months, beginning with October. We will take for a subject cooking. It has been said every housekeeper has her own ways of making bread, etc. Study the different methods, for, remember, there will be progressive housekeeping. This is a broad subject, and might run through several meetings. December might be a miscellaneous meeting. Each member who desires to do so might hand in a paper, story or poem, without signature, to be read to the club by the presiding officer, or one subject might be agreed upon as the subject for all.

January a reading circle, each member selecting from a favorite author. February a study of one of the poets. March a children's and young people's meeting. This would be enjoyed by all. April out-door farm work, flower and vegetable gardening, bee keeping, poultry raising, etc. All members of the club would not be expected to be working members, and these silent ones would no doubt be very valuable in such a club. Some one has said:

The best lives on earth are silent lives,
In the fields and woods the linnet's song
And swallows twitter, each all day long.
But seldom heard the nightingale that gives
Its sweetest notes under the evening calm.

Good music would also be a feature at those meetings. Almost every home is blessed with a musical instrument of some kind, and in all country places there are some fine musicians. Zither and mandolin clubs might be formed among the young people, and musical talent might be brought out that otherwise would never have been developed. No one enjoys music more than the farmer. The fields may be green, the flowers fragrant, but when the birds welcome the first rays of the dawn with their joyful notes it is a season of rest to brain. So these social entertainments might be made restful to the tired housekeepers, and, being the joint product of many women's plans and works, would be more to them than simply a social gathering.

EDUCATION.

EDUCATION OF OUR GIRLS.

BY MRS. PRISTINA HOWELL, OF SWEETSER'S.

[Read before the Grant County Farmers' Institute.]

The education of woman has been among the foremost problems of the present century. It is something more than a social problem. It is a civil and political, a moral and religious problem as well. Inasmuch as the presence of woman constitutes one of the chief charms and benefits of society, and inasmuch as it is she who, far more than man, gives character to society, her education and culture are a social problem. Into her care has been entrusted the nation's future statesmen, those who are to be clothed with authority and to make laws for the government of mankind. Hence her education becomes a civil and political problem. Not only is she entrusted with the guardianship of the intellect and character of the world's statesmen and philosophers; but her gentle presence as she bends over the cradle, and the silent influence of her daily life are shaping the entire moral character of the coming generation; and thus does the education of woman become a great moral problem. Again, since she shapes the moral character of the world, and since the eternal destiny of man depends upon the character in this life, it follows that her education becomes the profoundest spiritual and religious problem. In view of these facts what should constitute the education of our girls? Human life is short and its powers of endurance are limited. None of us can reasonably hope to accomplish all that our active imagination may picture to our minds as desirable. We can not appropriate all the great sea of knowledge. Sir Isaac Newton said he just picked up a few pebbles on the shore. But whether we are able to pick up many or few of these pebbles we should select only those whose size and shape best adapt them to our purpose.

Our girls' education should begin a century before they are born. Now, if the mothers, grandmothers, great-grandmothers and great-great-grandmothers had been our ideal of woman, then the training of our girls of to-day would be less laborious than it is. And the purpose of her education shall be the same as that of man, viz.: the acquiring of power, which shall be used in blessing and redeeming society, in converting the desert places of human life into gardens of fragrant beauty; for the only true kingship and queenship is that which consists in a stronger moral state and a truer thoughtful state than that of others. Then, if education fits for duty, it is important to consider what are the duties of woman.

The mission and rights of woman and the nation and interest of men are not antagonistic, for the intention in all life is harmony. To produce this harmony in human life, the right understanding and acceptance of the relations of the womanly and the manly mind and their duty to each are essential. Walter Scott, who gives the broadest view of modern society, pictures woman as combining intellectual strength with feminine grace and tenderness, as moved by a high sense of justice, as actuated by fearless, self-sacrificing devotion to duty, as animated by such wisdom and self-controlled affection as exalts not only her own character, but that of lover also. With this view of the character and power of woman we do not countenance the commonly accepted idea of the marriage relation which assumes that the woman is inferior, and, therefore, properly subject to the husband. Back in times of chivalry, the embodiment of the Christian ideal, the knight voluntarily submits to be directed by the lady of his choice, whose commands, by love and wise foresight, he feels himself highly honored in obeying. But sometimes marriage puts an end to this knightly devotion. Now, we like to have the home harmonious. The home should be a place of peace. The guiding, determining function which belongs to woman makes her home a sacred shrine of order and holy peace. We wish that every girl could come from such a home as John Ruskin pictures his boyhood home. We believe his home was almost ideal. Never was his father's or mother's voice raised in any question with each other; nor was seen an angry or even a slightly hurt or offended glance in the eye of either. Never was a servant scolded, nor in any manner blamed; never a moment's trouble or disorder in any household matter. Now, if our girls were all found in such homes as just described, their first lessons religiously would be easy and impressive. For Ruskin says first train the child spiritually, and that all features of education tends to the spiritual growth and development.

Perhaps woman's true place and honor would be to guide, to be the counselor and director of man, and to be capable of this guidance she must be good, wise, true and ready to serve. Now, what kind of education will fit the girl for this high dignity of gracious and noble womanhood? Her complete education must be spiritual, mental and physical. To attain perfect womanly beauty, give her such physical training as will secure harmonious bodily development. Train her in habits of accurate thinking; let her become a lover of nature and nature's laws. Let her see and know that nature has drawn no line between the beautiful and the useful. She looks at the potato and she sees before nature even allows it to grow and ripen she places the divine seal of beauty on it in the form of a little flower. That little flower, which is made the necessary condition of the potato's development, was placed there to teach us that there is use in beauty and a beauty in use. If we can make them lovers of nature and nature's God sublime their thoughts will be and the base will be debarred.

Teach our girls humility, and may we keep them humble, so that the microbe of vanity may never find nourishment in her being. By humility she feels that her knowledge will always be limited, and as she views the vast sea of knowledge it makes her feel how limited is her education by comparison, and she readily sees that there is more and more to acquire. Teach and train the imagination of our girls as to develop such an active sympathy with human suffering as will express

itself in helpful deeds, and they will know that they live in deeds and not years. The girl's education should be nearly, in its course and material of study, the same as a boy's, but perhaps differently directed, for we would have the girl's education especially applied in the daily home life and in social service. The girl's education should be earlier led, as her intellect matures faster into deep and serious subjects. Our girls derive much of their education from the field of literature.

Her first literature will be of such a nature as to suit childish fancy, such as fairy stories, stories of nature, of animal life, etc. But as she advances in years she may acquire the habit of novel reading. The girl's literature should add qualities of patience and seriousness to her thought and quickness of wit. Her literature ought to be of a nature as to keep her thoughts lofty and pure. Then we must be careful of the books they read. They, perhaps, are early tempted with novel reading, and it is not so much the badness of a novel we should dread as its overwrought interest. We will not stop to discuss how much of our girls' literature should be novels, but their novels should be chosen not for their freedom of evil, but for their possession of good. Thus we see the trashy reading would be excluded. The scattered evil that may occur and hides itself in a powerful book never harms a noble girl. But the emptiness of an author will oppress her, and his folly degrades her. Give our girls an education in music at an early age if it be within the power of the parents. Music is a means of soul development and heart culture, besides being an outward accomplishment. The history of music is the history of human development. It is the sensitive gauge that has marked the civilization of every age and nation. It is not especially necessary that they must become proficient, for that is optional, but if they are skillful enough for home amusement and pleasures in the home circle, it will be one of home's attractions that will aid in keeping our young folks from seeking amusements elsewhere. A movement is on foot to have music taught in our common schools. Then it will be within reach of every little urchin. We say God speed the day, for know that an instructor in music once said that nothing would take the cussedness out of a bad boy as soon as music, so hasten the remedy. Now, our girls' physical training and exercise is to secure her health and perfect her beauty. The highest refinement of that beauty can not be attained without splendor of activity and of delicate strength. Physical freedom is vain to produce beauty without a corresponding freedom of heart. There must be a feeling of delight in the work or its effects will be opposite from what was intended. You can't make the girl lovely unless you make her happy. There is not one restraint you put on a good girl's nature—not one check you give to her instincts of affection or of effort that will not be indelibly written on her features with a hardness which is all the more painful because it takes away the brightness from the eyes of innocence and the charm from the brow of virtue. For physical and muscular training of our girls in city or in country we think a little gardening would be conducive to beauty and good health. It is a means by which a woman can become self-supporting. But few of our American women garden further than to supply their own household and some not that. Every housewife and daughter requires the change of occupation which a few hours of gardening every day in the summer season would give her. She will improve her health by the amount of outdoor air and exercise the work will require.

Gardening is a delightful womanly occupation, cleanly and health giving. It is an occupation well adapted to women, as it offers healthy employment in which delicacy of touch, judgment, calculation and expectation are all realized without an undue amount of bodily labor. It will add business qualities to her ability of being a hustling business woman. Girls can also give their attention to the culture of flowers, not only for home decoration, but may engage in it as a means of money-making. In Germany and Switzerland women are now taught the culture of flowers as a profession, and many women are earning their living as vegetable and flower gardeners, not only at their own homes, but in the employment of others. Doubtless there are many young girls who find in the garden not only the natural roses which bloom there, but the roses of health with which to adorn their cheeks.

Again, if our girls wish to do farm work so much the better. Now, mothers, let the young girls get their hands in. Good looks are no substitute for the lack of good qualities. Let our girls become acquainted to a certain extent with the science of bake-ology, boil-ology, make-ology, stitch-ology and mend-ology. And unless she does, it will soon be an evident fact that she is out of her element. Give our girls what we would term a domestic education. Make her a thorough housekeeper; do not let her training stop by caring for just one spare room in the house, for if we do, then an old auntie's expression will be sure to be true. The house would be a "Queen Anne in front and a Mary Ann behind." Mrs. Henry Ward Beecher says: "No high or noble position was ever attained without taking up and bravely bearing some cross. No path ever led to that which was worth honest labor without some thorns. No woman can build a most precious home who does not well understand that she must, for the crown that is set before her, cheerfully accept much labor, suffering and self-sacrificing." It is the natural condition of things that all women should be housekeepers, whether they ever keep house or not. In order to be successful in administering the affairs of home, every young girl should, if possible, learn the practical routine of housework, performing with her own hands the various duties which pertain to it. "They learn to do by doing," says an old adage. This need not interfere with her music lessons or studies at day school, or even if she is acquiring some trade or profession, for when so doing she is learning a profession that always finds employment. There are in all girls' lives some years of waiting which can be profitably employed in learning to make home comfortable. It is not the mere handling of pots and pans, washing, ironing, washing of greasy dishes, the sweeping of dusty rooms, but it is a labor of love for ones dependent upon us; it is, indeed, a form of religion, for labor is worship.

Housekeeping requires an education, adaptation and natural tact to fill the position satisfactorily. Housekeeping can be raised to a science or it can be made a menial occupation. In other words, housekeeping can be conducted by system, and the lack of system makes housekeeping a burden, especially to farmers' wives. It is this lack of system that disgusts our girls and hence they go to town to work or clerk or take some business course, etc. We will find homes where work is never done, and the members of the family are always busy, but instead of driving the work the work is driving them. In other homes, with the same routine of work, same size family, there never seems any work to do, everything in apple pie order. What causes the difference? Answer, system. There is no machinery in

the world that does more perfect work than the human hands, and these are, or should be, regulated by the head and heart. A painter was once commended upon his blending of colors, and he was asked what he mixed his colors with. He answered, "With brains, sir." Educate our girls in the science of cookery. Emerson says, "There is always a best way of doing anything if it is but to boil an egg." Ruskin says, "Learn the economy of the kitchen." There is a story of a husband whose wife had died. The husband was uneducated, had few mental resources, but he had lived happily and comfortably with his wife. So he was asked to write an epitaph for her tombstone. He wished to commemorate his wife's worth by selecting one out of many of her virtues. So he wrote this: "Her picked-up dinners were a perfect success." Many a woman with a more pretentious epitaph leaves a less satisfactory record. Here is one for the modern belle:

"She had views on co-education,
And the chief needs of the nation,
And her glasses were blue and the numbers she knew,
Of the stars in each high constellation.

And she wrote in a handwriting clerky,
And she talked with an emphasis jerky,
And she painted on tiles in the sweetest of styles,
But she didn't know chicken from turkey."

Surely, a woman who didn't know chicken from turkey would be a very poor housekeeper. Then do train our girls well in the science of cookery.

We may live without poetry, music and art,
We may live without conscience and live without heart,
We may live without friends, we may live without books,
But civilized men can not live without cooks.

Once, and perhaps yet, the Iowa Agricultural School taught the junior class of girls to cook in a very thorough manner. The girls were taught to make bread, raised and baking powder biscuits, pie crust, various kinds of puddings, to cook a roast and broil a steak. All this work was actually performed to the satisfaction of the faculty. Girls may become so skilled in cookery as to command a good salary. The science of cookery has been put in practice in past time. The Grecians valued a cook so highly that the head of the kitchen department presided at all public ceremonies. The chief cook in a Roman household often receives a salary equal to \$4,000 per year. Vanderbilt at one time did better than that, paying his chief cook \$7,000 per year. But, above all features of cookery, let our girls triumph in bread making. "Give us this day our daily bread" is one of the petitions of our Lord's Prayer. How many times does the weary soul of the young husband (and sometimes the old) long to add with due reverence: "Give it to us white and light and sweet, wholesome and digestible, that we may be comforted and strengthened." The literal meaning of the word "lady" is loaf-giver, a token of hospitality, a badge of ladyhood. Some one said that it was not ill temper or passion that made men go mad and act ridiculous or commit suicide, but it is heavy, sour bread which prevents the whole current of their being and transforms human beings into demons. If a woman secures the happiness of her own family she must make good bread.

The thrifty, economical German fathers have a very pretty way of interesting their young daughters in bread making and at the same time reward them for their industry. They conceal numerous small silver coins in the flour and the girls find them in kneading the bread. Such a method is commendable and would be highly satisfactory to our American girls if practiced by their mothers. Instruct our girls in the care of poultry, caring of milk and the making of butter. Make her domestic education as thorough as possible before any other profession is taken up. We believe in girls taking up the professions just the same as men. But if she is proficient in domestic work she can secure a position any time, when the professional avenues are filled. Many of our girls leave their rural homes and secure positions and work in the city. They prefer clerking for \$4 per week and pay \$3 per week board than to work as a domestic in a nice home for \$2 per week and board furnished. Ah, mothers, be careful how you let your girls go to the city for employment. It is stated that the majority of women that parade the streets and haunt the dens of shame in the cities are our country girls and women.

Give them a thorough home education first, then when they take up a business course they have more genuine common sense, more good mother wit, and she is better able to cope with the world. Keep her at home as long as possible, prevent those early marriages by making her a thorough little business woman, then she is hard to suit when it comes to selecting a husband. You see she is aware of these transient young men. She remembers and knows to a dead certainty that one good farmer's boy or industrious mechanic is worth all the floating fops in Christendom. The allurements of a dandy Jack, with a gold chain around his neck, a walking stick in his paw and a "two-fer" in his mouth, some good, honest tailor's coat on his back, and a brainless though very pretty skull, never, never, never can make up the loss of a good father's home and a dear, good mother's counsel, and the society of affectionate brothers and sisters; their affections will last, last while that of the razor-toed dude will be lost in the wane of the honeymoon.

Fathers, you must help some in the education of our girls. You must be willing that the mothers may compensate or pay our girls for their work as you do your boys. Then there is motive and compensation, too, in the work they do. Let the mothers divide the butter and egg money with the girls; they need money and it is very embarrassing for her to ask for it, and she needs it, too. There are pennies needed for Sabbath school, for missionary funds, preacher's salary, collection for poor, chewing gum, bicycles (era of the new woman), and many other things. She learns economy at home, hence will economize in her own household. Let her into the business affairs of homes, the earnings and expenditures; she learns the cost of keeping a home, and will ignore and condemn these fifteen-year-old marriages, for she has better sense. Fathers, let no young man be more gallant to your young daughter than her own father. You be her best beau. Be a man, as Ruskin says, then she will weigh her gentlemen friends by you. She will compare and contrast them spiritually and morally by you, for you have helped to teach her that modesty and purity are twin sisters, and vulgarity and vice are seldom ever divorced. Then she will seek the model young man, the one who has a good trade

and is a good workman at his trade and is able to make his home comfortable. He will have an incentive to continue his good work, for he has an accomplished wife that makes home a sacred shrine.

• SHOULD AGRICULTURE BE TAUGHT IN THE PUBLIC SCHOOLS.

BY JOHN W. RENFRO.

[Read before the Tipton County Farmers' Institute.]

Agriculture is derived from the Latin word *ager*, field, and *cultura*, cultivation, literally meaning, cultivation of the field. In its broader sense it is the science of cultivating the ground, including the preparation of the soil, the planting of seeds, raising and harvesting of crops, and the rearing, feeding and management of live stock. A still further definition of the word would mean the application of labor or means in rendering productive, in reducing, in refining and ameliorating, in cherishing, promoting or advancing the soil.

The tilling of the soil began with the expulsion of our foreparents from the Garden of Eden. They must ever after exist by their labor. Before they existed without it. It was there by divine command, and essential to human demands, that in the "sweat of his face" man should eat bread, and that he should contend with thorns and thistles until he return to the ground from whence he was taken.

Now, after a laconic definition of agriculture, I come to the subject, Should agriculture be taught in the public schools? To this interrogation I would answer yes. Why? Because it has been taught in the public schools ever since the beginning of education in this country, and to discard it now would be retrogression. Husbandry, like other occupations, should receive its due attention. A person, in any profession in life, must have some knowledge of the work that is before him. How is he to acquire it unless he is taught? It can be obtained by study and the proper training. The farmer, to be a successful one, must be taught his profession. The day is coming when the uneducated and untrained farmer will be relegated to a back seat, and it will be the educated and up-to-date yeoman that will occupy the front seat.

We can see the future of the farmer in the Farmers' Institutes, where he is earnestly discussing the best and newest agricultural methods and striving to know more thoroughly his profession. There is a growing demand for educated farmers, and he who strives for the promotion of his profession is a progressive farmer.

A movement began in this country for the education and research in agriculture more than a century ago. The widening of agricultural information at the end of the eighteenth century was of unusual activity. The attention of practical and scientific men were directed to the discoveries of science in regard to the advancement of the oldest of human occupations, which resulted in the formation

of agricultural societies. The first society for the promotion of agriculture in this country was organized in the "Keystone State," at Philadelphia, which was the capital of the United States March 1, 1785. It seems, from history, that this society was organized by men who had no immediate connection with agriculture, but being cognizant of the fact that it was a neglected institution, and that they would give it a new character through the avenues of education.

After the experiment had been tried and its future foreseen, a deep interest was manifested by the support of such men as Washington, Franklin and others.

An agricultural society, whose chief object was to establish an experimental farm, was organized in South Carolina in 1785, and was incorporated in 1795, and bears the title of the State Agricultural Society.

A similar society was organized in Massachusetts March 7, 1792, and also one in Connecticut March 12, 1794.

About the first steps were taken in agricultural education in 1792 by Samuel L. Mitchell, who was a professor of natural history and chemistry in Columbia college.

Lavoisier was the first scientist to make the application of chemistry to agriculture. Steps were taken in January, 1794, by the Philadelphia society to educate and train the youth in the knowledge of that most important of arts by offering premiums and other incentives. This plan became a part of the common school system. Selections from the best writers in husbandry and essays from those who experimented in the art were procured for the students in the fundamental art.

Washington, in his message to the Fourth Congress, considered agriculture of primary importance, and that the cultivation of the soil should be more and more an object of public patronage.

The first cattle show was given in Massachusetts in 1807. It brought about such an interest that a larger show was held three years later, and after that it became a permanent institution in that State. The first national organization was perfected in 1809, and known as the Columbian Agricultural Society. This society was for the express purpose of educating farmers by means of exhibitions.

Everything in agricultural education was progressive from 1810 to 1840, followed by a four years' lull. In 1844 agricultural education received a new impetus, and new resolutions for its onward progress were adopted. A resolution in the New York State Agricultural Society, in 1844, is as follows:

"Resolved, That this society regard the establishment of an agricultural institute and pattern farm in this State, where shall be taught thoroughly and alike the science, the practice and the profits of good husbandry."

Another resolution from this same society was that the elements and scientific principles of agriculture should be taught in all our public schools. In consequence of these resolutions, schools were established for the purpose of promoting education in agriculture.

Agricultural education began to become more universal in 1845, and by this date it had reached the South. A course of lectures was given at New Orleans by a professor of Yale College. It next took a bound and found a home in the State of Michigan in 1857. To this State belongs the honor of first putting into actual

operation an educational institution for the direct promotion of technical training in agriculture.

A greater encouragement for the attainment of a higher agricultural education was given by the Morrill act of 1861, which provided for the establishment of colleges "to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Now, I have, by the aid of history, proven that education in agriculture is no modern idea, but is over a hundred years old, and that great efforts have been put forth for its onward progress. It has been encouraged by great and learned men, intensified by premiums and sanctioned by legislation. We see the interest taken in it in the past, and that it was taught in the public schools then, why should it not be taught in the public schools now? If it was necessary then, it is necessary now. If it was a benefit then, it would not be a detriment now. If it was advancing then, it would not do to impede its progress now, but give acceleration to its move, so that the coming farmer may be better trained and taught than the farmer now.

Our greatest endeavor should be for greater acquisition of knowledge in husbandry, in order that the future may have better and more proficient farmers. The farmers should educate their children in the science of agriculture by sending them to some good agricultural college, there under competent instructors be taught the work they are to do. What we need to-day is better educated farmers; I believe that the future is going to produce them, too.

I leave off by saying, "By all means educate the youth of our land in the art of agriculture if you expect him to be a successful and progressive farmer. To make a success in any calling in life requires a knowledge of that calling. As agriculture is the oldest of human occupations and the basis of all life, it, therefore, ought to receive more than ordinary attention. They who choose agriculture as their occupation in life should not neglect the important part of obtaining a proficient knowledge of it, and I know of no better place for obtaining that proficiency than in the public schools of our country."

HOW AN AGRICULTURAL EDUCATION HELPS A YOUNG MAN TO FARM.

BY CHAS. DAVIS, LAKELAND.

[Read before the Parke County Farmers' Institute.]

In discussing this subject I shall state first wherein a general or a liberal education will help the young man who expects to farm.

An education means a development of the mind, helping us to think deeper and better, and helping us to reach accurate and concise conclusions of the problems we encounter. It means that we are to use intelligence and knowledge to assist physical power in accomplishing the results we wish.

At the present state of civilization it would be a mere loss of words to state that an education is essential for a professional man, as doctor, lawyer or engineer. Many of the professions have made such advancement that many years of education are necessary to become properly equipped, and every one recognizes the fact. But in agriculture, I am sorry to say, many people hold the old idea that an education is not necessary to the young man who expects to farm. However, this idea is fast disappearing, and farmers' sons are seeking education, such as to equip them for scientific and systematic farmers.

There are many ways in which an education will help such a young man. It will be great aid to him in his relations with men of other professions. We now see the day when the men filling professional positions are well educated, and, since this is the case, the farmer should be as well educated as those with whom he is thrown in contact; if not, he is more or less at the mercy of those with whom he deals. The farmer must be able to think conclusively, accurately and honestly in his relations with other men and hold himself as their equal. This can be accomplished to a great extent by giving the mind a proper development and a knowledge of every day affairs. An education is necessary to keep an even pace with men of other professions.

The farmers of the past have been considered among the best American citizens. They are considered so to-day, and there is an evidence that the future will reveal the same fact. Good and useful citizenship is something which is open to every American.

The government affairs and political questions which come before the people should be understood by the farmer as well as by men of other professions; and at this stage of civilization, where mind rules instead of muscle, it is surely necessary that farmers give considerable attention to the development and cultivation of the mind.

There are indications that agricultural education will play an important part in the future development of American farming. The sciences of chemistry, botany, physics and geology lie at the very foundation of agriculture. Every farmer knows considerable about the subjects, but he has not a scientific knowledge of them, and thus is hampered in applying nature's laws for his own benefit.

If you think there is not anything in agricultural education just look over the courses offered by any of the agricultural colleges. These courses have been prepared by men who know what it means to be able to apply the laws of nature properly. The farmer has to work with nature almost constantly, consequently, it is absolutely necessary that he have a knowledge of nature's laws.

The government has recognized the importance of a scientific investigation of agricultural problems, which are constantly arising, and for their solution, and for instruction to farmers has established the experimentations and the department of agriculture. The annual report shows that much investigation is being made in all branches of agriculture.

The farming class composes a large part of the population of the United States. Agriculture is one of the great sources of American wealth. And since agriculture and the agriculturist hold such important positions the farmer should be

thoroughly equipped and fill this position in a manner which will be worthy of the recognition already given.

While there has been stated wherein an education will help a young man in a general way, there are many ways an agricultural education will help him practically.

This age of advancement and progression has brought about new conditions and environments. There are more intricate problems to be solved. In the early history of this country the farmer saw vast forests on every hand, but these have been cleared away and cultivated fields greets his eyes. The soil by long cultivation and failure to replenish has been reduced in fertility to some extent. The population has been increased and the farmers must now feed a great nation. The old methods would not supply food for an expectant people, consequently, new methods of farming, improved farm machinery, methods of retaining soil fertility, scientific methods of feeding, are in demand.

As stated before the courses offered by our agricultural colleges are broad and comprehensive. They offer instruction in both scientific and practical subjects. The most approved and improved methods of all phases of farming are taught. The instruction will be a great aid to any young man to farming in a scientific and systematic way.

A discussion of the different phases of agriculture as taught can not be entered into as it would require too much time. The fact that such methods are scientific, practical and economical is an evidence that a knowledge of them is requisite for a young man to farm successfully.

People are beginning to recognize farming as a wide-awake science, and for that reason every farmer, especially a young farmer, should have a knowledge of scientific and natural laws.

Now, the question arises, are practical and scientific subjects all there are taught in our agricultural colleges? No. Such subjects as mathematics, literature, history, German, French, psychology, political economy and others are taught to the agricultural student. He is in need of such subjects as much as any citizen to help him in the daily walk of life.

MISCELLANEOUS.

CHAIRMAN'S ADDRESS.

BY GEO. M. YOUNG, NOBLESVILLE

[Delivered before the Hamilton County Farmers' Institute.]

LADIES AND GENTLEMEN.—In accordance with custom it now becomes my duty to in some way address this meeting, and being somewhat averse to following the beaten track, and believing the time taken by the welcoming address with its accompanying response might at least be as well used in a brief address touching upon topics that are near to the farmer, I beg your indulgence for a few moments.

It is with a feeling of the deepest gratitude for the warm and loyal reception that has been accorded us by the citizens and business men of this lovely city, extending to us that warm welcome which will bind anew that feeling of fellowship which is so indispensable to beings of a common brotherhood. And let me here thank in a word all who have in any way assisted in arranging and perfecting the details of this meeting. We meet with you here for our mutual benefit.

Recognizing that because of our combined efforts in our various paths of life, has it been made possible for us to enjoy this meeting here, surrounded by so many of the environments which go to make home life pleasant. And we should not forget in this year of plenty, of bountiful harvests, to humbly and fervently thank the Giver of all for the many comforts that surround our homes at the close of this year. I often revert to the thought that we as a people ought to devoutly thank the Ruler of our destinies that our lot has been cast, our homes have been made in this land of plenty, and in this age of enlightenment and human liberty, where any boy or girl well endowed by nature may go to the topmost round of the ladder of his ambition, regardless of birth, race or color, and where one man has no proprietorship over another.

Then, since the opportunities are so many, let me urge all young men and young women starting in life to a lofty ambition and worthy confidence in self. Never be content with keeping up with the procession, but strive with a worthy ambition and resolute determination to keep in the lead. No matter what business occupation or trade we may take up as our life work, if in the front ranks there will be plenty of room, while those in the rear are always pushing and crowding. We must set our stakes high if we desire to excel. We must keep up with the van or be crowded to the wall. We can't live as people do now and farm as they did fifty years ago.

Nor should we be unmindful of the generations of farmers that have come and gone. To them we owe much of what we enjoy to-day. With them it was a struggle to wrest enough of nature's domain from its primitive condition, upon which to gain a livelihood. By their efforts the forest and the jungle disappeared, the swamp was reclaimed, and the whole transmitted to us in broad and fertile fields. But for their efforts, and ours, where this beautiful little city now nestles the tall forest trees would be all but dipping their topmost branches in the dewy clouds, and the wild wo'f would be howling, and the wilder Red man would be prowling about, seeking to murder and scalp his defenseless victim. We begin where our fathers left off, having the benefit of their ripe experience, and certainly should improve, and thus add to what has been transmitted to us, what we have learned. Let us strive to so conduct our operations that when we are done with farms and farming, and our sons and daughters come into possession of the old homestead, there will still be fertility enough left to justify and enable them to further beautify and improve them. One other thought. Honest toil is ennobling, and he who seeks by word or deed to ridicule the farmer boy, or girl, only shows that he is a conglomeration of egotism and stupidity. Destroy or paralyze agriculture in this country, and our nation is no more. I know that there are a few people running loose in this country, who look at labor as degrading. Let us look at this class with charity, and hope, "for the good of our country," that they are an ever diminishing number. There is no occupation, business, or profession, that is more ennobling than that of the farmer. If we do not dignify it, the fault lies with us, and it is the urgent duty of every parent to see to it that those entrusted to our care go out into manhood's or womanhood's estate well equipped to fight the battles of life successfully. This can be done only by giving to them a good practical education, which is the best heritage we can bequeath to them. It has always been my firm belief that if the first gentleman who engaged in agriculture had been more enlightened, he would not have slain his brother. If the financial troubles which have recently swept over the country, have proven one thing more conclusively than another, it has proved the uncertainty of business ventures in the city, and the certainty of competence, comfort and the best things of life to those who sensibly and systematically follow farming. Education and training pay on the farm as they pay elsewhere in life, and the young man who fortifies himself by a good practical education will succeed, "other things being equal," much better than he who neglects this prerequisite. When we stop to reason, we find that nature has her rich treasures buried in earth, and it requires scientific knowledge and research to reveal them, and combine original and acquired elements for best results.

The universal depression and consequent low prices has tended to discourage farmers, but let us hope that the years to come will bring better prices; let us be hopeful and resolute; let us be courageous; let us be watchful; let us have the courage to, "in all fitting places," denounce that which is wrong and keep an eye on the legislative bodies of our country and rightfully demand a fair share in the beneficiary laws enacted; let us teach our children to be self-reliant, self-thinking and independent people. Yes, and let us hope that somewhere in the near future our sons and daughters will be recognized as equals and no distinction made

because of the mere accident of birth. We believe the time will come when this now recognized difference will be looked upon as but another relic of the dark ages, which has hung to us with fearful tenacity, notwithstanding all our boasted rights of citizenship. As we look backward over the long line of our progenitors we find that in all the ages that have come and gone since Cain's first effort at tilling the soil, the farmer has been enshrined in song and honored by the historic muse. Poets have ever sung of the beauties of agriculture; it has ever been a favorite theme for artists and writers. Farming is no lowly calling if we do not make it so. And now as the year is closing we might profitably take a look backward, carefully noting the mistakes as well as the successes; we will profit by both in planning for the future.

And now, in conclusion, let me say we have tried, with the limited means at our command (limited both in money and experience in Institute work) to so arrange our program as to give us an interesting and instructive meeting. Then let us all work in harmony toward the common end of making this the best meeting yet held in our county.

CEMENT FLOORS.

BY ARTHUR HOADLEY, OCKLEY.

[Read before the Clinton and Cass County Farmers' Institutes.]

The time has come when we can no longer afford to practice the old slipshod way of farming. We must begin to use our brains as well as our hands if we expect to make a success of our business. We have come to a time when we must choose between two lines—we must take better care of our land or we will have to buy a commercial fertilizer; then we will fully realize the extent of our folly.

It costs no more to cultivate a field to grow sixty to eighty bushels of corn per acre than it does to grow twenty-five and thirty. We are between two fires; our eastern friend has the advantage of being near market for the products of his dairy and his garden, and our western competitor has the advantage of his cheap land with deep, rich soil. We can not successfully compete with them unless we do our best. Indiana is most favorably situated for agriculture in all of its branches. Now, what we want to do is to call a halt, and take a start in the right direction. We must pay more attention to the saving and applying of all the manure made on the farm. Manure is plant food, and plant food is what we want and must have to grow good crops, and I know of no way of saving the manure as good as with a cement floor in our stable. We were not content to take 50 per cent. (that which is contained in the solid manure), we want it all; and, without a floor water-tight in our stables, it is impossible to save near all of the fertilizing value.

A chemical analysis proves that where the manure of all kinds of stock on the farm is all saved and put together that about one-half the fertilizing value is in the liquid, and how few of us save all of this to the best advantage. We need not

think when we have a board floor in our stable with the boards put far enough apart so it will keep dry (as I have heard some say) that we are getting any more than half of the manure, even if we bed deep and clean the stable every day. The manure is often put in a pen or thrown in a pile by the side of the barn, and in a great many cases where the land is very slanting and often under the eaves of the barn where it heats and escapes and leaches down and is washed away by rain until it loses the greater part of its strength, then it is taken to the field and put in small piles where the rest of the strength leaches and is washed down by rain in small places before it is scattered where it is intended to stay. Now this is not business. A cement floor costs no more than a good sound oak board floor does; it takes more work to put it down, but if done right once it is there to stay, and any one with good judgment can put it down with regular help after harvest with little extra expense. Some have the idea that a cement floor would be nice to have but are too costly for these hard times. This is all wrong, it is the only floor we can afford to use. You will see where twenty head of cows are kept in the barn six months in the year and fed on an average of forty pounds silage, ten pounds hay, five pounds wheat bran and two pounds oil meal per day, she will consume \$21 worth of fertilizer, and a cow giving milk takes 40 to 50 per cent. of the fertilizing value in the feed consumed, while a steer that is being fed for beef only takes about 20 per cent. Now we see our cow has eaten \$21 worth of fertilizer and uses on an average 45 per cent. of it. The manure, if all saved, would be worth \$11.55 or \$231 for the twenty head. Now if we waste all of the liquid, or one-half of the value, we lose \$115.50 worth of plant food. Now the loss is even greater than this with horses, the liquid manure being worth about four times as much as the solid per ton.

As to the cost of cement floors. We have room for twenty one head of cows in our stables, and the cost for the cement alone was \$21.00. Work and all would not exceed \$50.00. We used the common Louisville cement, at wholesale \$1.00 per barrel. Used one part cement and two parts sharp gravel and coarse sand mixed. We thoroughly mixed it dry, then wet it and put it all down at one coat, about four inches thick, with gutter behind cows eighteen inches wide and eight inches deep. This includes the floor in feed alley and under manger. We prefer it cement also as we have water trough in the barn. The cows sometimes throw out a little water and it has no effect on the cement, while if it was wood it would rot it out in time. Then there is much less chance for dirt and filth to gather on the cement. The liquid manure is absorbed with straw and bedding of various kinds, and it is all taken to the field together direct from the stable and scattered at once, unless the ground is covered deep with snow. Then we put it in small heaps and scatter as soon as the snow goes off. I feel safe in saying that 60 per cent. of the manure made in this State is wasted before it ever reaches the field. Now, my friends, this is not doing our best. The manufacturer or business man does not succeed when he is careless and does not watch everything and use it to the best advantage. How can we expect to grow paying crops on our field always if we neglect to take care of it? So let us take care of our land by putting in cement floors in our stables so we can save all the manure and use it to the best advantage, and see if we can't make our farm pay a larger per cent. on the money invested than any business in the country.

TYRANT FLYCATCHERS—THE KING-BIRD, THE PHOEBE-BIRD AND A FEW OF THEIR RELATIVES.

BY MRS. JANE L. HINE, SEDAN.

[Read before the Dekalb County Farmers' Institute]

The different species of this group of birds are, as a rule, clothed in plain colors and the sexes alike. Their crown feathers are erectile. The bill of the Tyrant Flycatcher, broad and flattened at base and tapering to a sharp, hooked tip, is formed for lightness; its mandibles are hollow. That the rather broad mouth may be more capacious, its roof is excavated, and it is cleft well into the cheeks. This cleft is furnished with bristles that curve outward and to the front, in some species as far as the tip of the bill. This roomy mouth, protected at the sides by its bristles as by bars, is a cage from which a captured insect is not likely to escape. Usually the tails of the different species of this group vary but little in shape. The tail that is a trifle rounded, the square tail, the tail that is very slightly forked, are shapes that are common with them; but among North American flycatchers there is one genera of two species whose tails are forficate, like a Barn Swallow's. One of those species, the scissor-tail—abundant in Texas—a bird whose body is about the size of the King-bird's, bears a tail that is eight inches and sometimes a foot long. Their feet are weak—good for perching, but not for hopping or walking. A Tyrant Flycatcher never hops; he always uses his wings for locomotion. He often wheels while perching, that he may watch in a different direction, but to do this he elevates himself enough to clear the perch. He very seldom goes to the ground, but in case he does he must rise from the place where he alights.

Tyrant Flycatchers are not inclined to take lofty nor protracted flights; but in their own way they are extremely expert in the use of their wings. They must be, for their wings are always used in capturing their food. They are as dependent on their wings in obtaining insects as swallows are, though in a very different manner. The Flycatcher chooses some perch—a bare branch, a weed stalk, a fence, an elevated clod of earth, a sharp rock—some perch within a clear space, and there watches for prey; watches patiently, as a cat watches for a mouse, until the right kind of insect comes sailing along, then a darting sweep into the air, a click of the bill, a return to the perch, and the patient watch is resumed.

Birds of this family do not assemble in flocks, nor ever, as a rule, even in small companies. The King-bird, just at the time of his arrival in spring, may now and then be seen with two or three companions; but, as a rule, a Tyrant Flycatcher of any species tolerates no society but that of his mate or young.

It is interesting to see these birds bathe; they bathe upon the wing. From their perch chosen near the water they sweep down through it and back to perch again. To complete the bath a number of these swooping plunges are taken, the bird stopping a few moments to dress his plumage after each plunge.

Of Tyrant Flycatchers we have in our vicinity five *genera*, represented by eight species.

Of the *Little Olivaceous Flycatchers*—King Gnat-catchers—we have four species, Yellow-bellied, Traill's, Least, and Acadian Flycatchers. These little birds are unobtrusive in dress and habits.

THE YELLOW-BELLIED FLYCATCHER

Is the brightest species of this group, his back olive green, his belly yellow. He is very rare here, even as a migrant. I meet with him almost every spring, as he pauses in his migration, in one particular part of a certain wood just where it is bordered by a wooded swamp, and have never seen a bird of this species elsewhere. Usually his stay has been short, but once he and his mate were here at least through July and August; a very uncommon thing for Yellow-bellied Flycatchers, as it is their habit to push on and summer farther north. This pair seemed to be homing in the swamp, but made daily raids through the wood. The males trilled "Pea-wayk, pea wayk," revealing their progress. These little birds are very playful and gay.

LEAST AND TRAILL'S FLYCATCHERS

Are usually regular migrants here; though I think I have reason to believe that now and then a pair of either species may tarry with us, in just the right localities for nesting. They seem well satisfied with our bushy swamps. Both are here from about the first to the latter part of May; the Least usually common, Traill's rare. It is hard to distinguish these birds one from the other, and, during their pause here in May, about the only way we may know each species is to observe the silence of the Traill's and the almost constant *whit, whit*, and an occasional, quickly uttered, low *se-wick* of the Least. I have heard the song of the Traill's here the last of May, when mated.

THE ACADIAN FLYCATCHER

Arrives here early in May and remains right through the summer to work for the interests of those who own forests containing beech trees; and as such forests are common with us, we have the bird quite evenly distributed. For a nest, the female manufactures a delicate, shallow cradle, suspended by all its sides. Beech twigs are disposed at the fork of a bough just right for its suspension; and so it is that the bird almost invariably chooses a beech. I once found its nest in a maple; the only one I ever found or heard of being in any other than a beech tree. This little Flycatcher gathers many worms from the leaves. He stands intently looking for his worm, discovers it, then sallies out and flips it from the leaf while passing. I have seen him hold himself suspended on hovering wings, before a tree trunk, darting upon it again and again, for insects in the bark. The Acadian Flycatcher may be recognized by his emphatic *pea*, uttered steadily, but with a pause of about thirty seconds between each utterance. Also, during his season of love, by a low whistle, heard only while he is flying from one perch to another; a whistle like that we often hear, in their short flights, from the Dove or Pigeon Woodpecker.

Of the group called *Wood Pewee Flycatchers* we have one species.

THE WOOD PEWEE.

Of this bird we may say :

He dwells within the forest,
 He loves its deep recesses,
 He loves its leaf-roofed temples,
 He loves its swaly places ;
 He captures his food,
 He rears his young brood
 In the shadowy wood ;
 And sweetly chants his trailing lay,
Pe-to-wee, pe to-wee, pe wee, pe-wee a-y.

The Wood Pewee is so like the Phoebe-bird in color and size that it may seem a difficult thing to distinguish one bird from another; but look at the tail; the tail that is quiet is the Wood Pewee's; the tail that is constantly flipped is the Phoebe-bird's. In notes and habits the two birds are very unlike. The song of the Wood Pewee, so plentifully given, is sweet and unobtrusive; the same among birds' songs—so I fancy—as wild violets among flowers. The Wood Pewee builds, on the upper side of a limb, a cup-like nest, finished on the outside with lichens or moss. I have found it so low that I was able to reach it as I stood upon the ground; and, again, I have seen the bird making its nest on the base of a naked fork that towered well up towards the tops of the tall forest trees. This bird excels in the art of fly-catching. He often snaps up with click, click, click, click, click of bill, several insects in one of his sweeping sallies. He sometimes leaves his perch, and, on hovering wings, pauses in mid air to feed on gnats, here and there, and there, and there, before alighting. This busy bird works all the day through, from dawn until the evening twilight is ready to merge into darkness, and his diligent work is the destruction of insects harmful to forests.

OUR PHOEBE-BIRD

Comes to us as a representative of *The Pewit Flycatchers*. He arrives earlier in spring and remains later in fall than any other Flycatcher. When we begin to see small flies in the warm spring air we may expect soon to hear his pleasant call. The male comes first—comes direct to his former nesting place and, tarrying in the vicinity, awaits the arrival of his mate. This nest, on some shelf-like projection, may be beneath a bridge, under a railroad culvert—the thunder of passing trains does not disturb the serenity of the pair—under the roof of a shed, within some outhouse—perhaps above the door in easy reach of those who frequently enter. A Phoebe-bird must have a shelf to nest upon. It is well for the farmer to remember this if he wishes to increase the number of these birds upon his premises. Let him nail a board to the rafters of each shed, and see that every bridge that spans a ditch has its shelf, and the Phoebe-birds will be gratified and he well paid for his pains. This harmless bird leads a busy, useful life. Minot says of a pair while raising their young: "Probably no less than a thousand insects must be procured each day for several weeks." The Phoebe-bird is plain and homely, but charming in character, and we love him dearly.

Of *Crested* or *Rufus-tailed Flycatchers* we have one species,

THE GREAT-CRESTED FLYCATCHER,

A large bird for a Flycatcher—not quite so large as the King-bird—and common in our forests. His whistle, wheep, wheep, whip, whip, whip, whip, wheep, wheep, enlivens the solitude of our woods in summer. For a nesting place he chooses a hole in a tree. The season of his stay with us is short. He arrives here early in May and leaves us, usually, before September. He is a fine, spirited bird and a bold, expert flycatcher. When we consider that various species of grubs and wood worms that infest timber are the progeny of insects he likes for food we may understand how useful a bird is the Great-crested Flycatcher.

Prominent among Flycatchers is the group called *King Flycatchers*.

THE KING BIRD

Is one of this group. His clothing is plain—severely plain—but look at him as he stands watching on his perch, so erect and trim; his black head raised; his black tail, with its white border, a little spread; the gray of his back so clean; the white of his throat and breast so pure, and we must see that he is a handsome bird. Oftener than otherwise he is content with a lowly perch and lowly game; but sometimes he takes a high stand—perhaps on a bare branch at the top of an apple tree—and watches for lofty game. Then, his insect discovered, observe him as he sweeps grandly upward high in air, his white belly gleaming in the sun, and we must see that he is a magnificent bird. The King bird has one fault, he sometimes takes our honey bees; but, according to authority that is higher than mine, even the man who owns an apiary can not afford to have him killed. Wilson says: "Whatever antipathy may prevail against him for his depredations on the bees, I can assure the cultivator that this bird is greatly his friend in destroying multitudes of insects whose larvæ prey upon the harvests of his fields, particularly his corn, fruit trees, cucumbers and pumpkins. These noxious insects are the daily food of this bird, and he destroys, upon a very moderate average, some hundreds of them daily. The death of every King-bird is, therefore, an actual loss to the farmer." Coves says of the King-bird: "He destroys a thousand noxious insects for every bee he eats." The king bird destroys "many of those black god flies that cattle and horses so dread." He likes slugs and shell-less snails. Wasps are among his favorite insects. He almost lives on grasshoppers during the grasshopper season. I have seen him feeding at a web of those gregarious caterpillars, so well known to farmers as enemies to apple and other trees, called fall web-worms. The King-bird does not depend upon secrecy for the safety of his nest; he does not care if it is in plain view, he relies upon his own valor for its protection. He is able to drive the largest hawks, and even eagles flee when he annoys them. The farmer's wife who raises poultry need have no fear of crows and hawks if she has a pair of King-birds nesting in her orchard.

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